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Frederick S. Hulse

JEWISH FERTILITY IN THE UNITED STATES
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American Eugenics Society, Inc.

Acta Genetica et Statistica Medica

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STATEMENT OF THE EUGENIC POSITION

By the Special Committee
of the Board of Directors
American Eugenics Society

GORDON ALLEN, DUDLEY KIRK,
J. P. SCOTT, HARRY L. SHAPIRO,
BRUCE WALLACE

THE AMERICAN EUGENICS SOCIETY is composed largely of scientists from a number of different disciplines. Their common interest is to promote the advancement, discussion and dissemination of scientific knowledge of human genetics, as it relates to the welfare and improvement of individuals and populations.

THE PRESENT STATE OF KNOWLEDGE

Recent advances in the field of genetics make the times particularly appropriate for the activities of such a society. In the past decade or two, human genetics has made notable advances as a field of study. It has contributed new insights into the past and present evolution of man. Great strides have been made in analyzing the causes and inheritance of constitutional diseases. We have come to realize that genes which cause defects are not limited to the afflicted families, but that many such genes are spread widely throughout the population. We have learned that the genetic consequences of artificial radiation, of life-saving influences in medicine, and of new migration and marriage patterns are reflected in an accumulation of deleterious genes over and above the subtle equilibrium previously established by natural forces. Methods are being devised to detect the individuals who are carriers of genes that cause defects as well as to treat some of the defects at an early age. Increasing medical knowledge and increasing public interest have led to the establishment of heredity counseling centers, and to a new recognition of the importance of heredity in human affairs.

The genetic mechanisms related to intelligence and personality are as yet little understood. It seems certain that there are many genes involved, but the number and the method of transmission are not known. Much further research is needed to find out in what way and to what extent differences in intelligence and personality are determined by variations in genetic factors. Their outward (phenotypic) manifestation is the combined result of the interaction of a spe-

cific heredity with a specific environment.

Studies over the past 35 years have contributed convincing evidence that variations in genetic factors do have a part in determining individual variations in intelligence and personality. Studies have been made on identical twins reared at home or reared apart, on siblings, on adopted children reared in homes and in institutions, and on random pairs. When the environment is closely similar, there are still large individual differences, which are best explained by heredity. On the other hand, when heredity is held constant and the environment varied, there are still large differences, which must be accounted for by differences in the environments. Psychological and sociological studies hold an important place in advancing knowledge of the part played by genetic factors, of the distribution of these factors in the population, of the regularity of their expression in diverse environments, and of their significance to human societies.

THE ROLE OF THE AMERICAN EUGENICS SOCIETY

The function of the American Eugenics Society is to contribute to the advancement and dissemination of knowledge about human genetics particularly in relation to similar scientific knowledge from the social and biological sciences, including knowledge of the social and psychological factors which determine size of family among different kinds of couples. The Society's function is therefore to a great extent interdisciplinary.

The Society has a special part to play in enlarging the interests of various professional groups, especially in fields where there is an awakening scientific interest. When, after the Second World War, the medical profession began to be interested in genetics, the Eugenics Society's most successful work was in that field. The *Eugenics Quarterly* provided opportunities for publication of articles dealing with human populations in the broadest sense, at a time when other journals were not looking for papers of this sort. The Society's five fellowships in medical genetics were among the first to result in assignments to full-time teaching and research in genetics at major medical schools. Several conferences on medical genetic subjects and on the teaching of medical genetics were directly sponsored or primarily stimulated by the Society. The Society's publications and conferences on heredity counseling have received extensive notice in both professional and lay circles. The importance of medical genetics is now widely recognized and is getting support from the medical schools, from foundations, and from the government through the National Institutes of Health. The Society feels satisfaction in having played some part in this important advance in the field of eugenics.

Psychologists, sociologists and demographers are now showing interest in the study of the economic, social, institutional and psychological factors which, in the United States, influence size of family. Such studies are essential to finding out how social conditions might be modified, not only to bring about voluntary changes in the general birth rate, but also to bring about discriminating differentials in births as between individual couples of different genetic constitutions. It should be the function of the Eugenics Society to stimulate work in this field by holding conferences, by publication, and by such other means as may be at its disposal. Such studies, together with psychological studies on the part played by genetic variations, and on the means of measuring psychological

traits, constitute probably the most important fields to which the Society should now give its attention.

Matters of eugenic policy will be increasingly discussed as more knowledge is developed in these fields. It will be the function of the Society to provide opportunities for such discussion through publication and conferences. Sound eugenic policies will not develop in a vacuum. They must grow out of existing knowledge applied to the conditions and mores in particular countries.

CHANGING SOCIAL PATTERNS AND EUGENIC POLICIES

Habits, culture patterns and institutions which affect reproduction and survival are changing rapidly in the United States. Eugenic policies, if they are to be effective, must anticipate and recognize these changes.

The most basic change is the reduction of deaths prior to the age of reproduction. In the United States over 95 per cent of all children born alive now survive to their thirtieth year. Early death is no longer so great a factor in reducing the survival of the physically or mentally unfit. Eugenic policies will try to find an acceptable substitute for death selection.

Accompanying the reduction in deaths, there is an equally marked trend towards limiting size of family. A study made in 1955 indicates that over 90 per cent of all fecund American couples use some form of family limitation at some period of their married lives. If, as may soon be expected, simpler, cheaper and more acceptable means of family limitation become available, we may approach a society in which all children are quite specifically "wanted" children. This would not of itself make for eugenic trends in births, but it would at least make possible policies for eugenic birth selection based on voluntary controls.

In the United States today there is a trend towards equalizing educational opportunities; there is also a trend towards fitting education to the abilities of the individual. There are trends towards an increased social mobility, greater job mobility, and the elimination of fixed hereditary classes. These are all changes which would make it more likely for each individual to find the kind and level of work most appropriate to his genetic potential.

The trend towards more employment of women outside the home offers alternatives to childbearing which eugenics programs will have to take into account.

The circle within which one can choose one's mate is constantly widening in the United States today, with a greater possibility of assortative mating. Assortative mating can increase the number of people with particular qualities by changing the distribution of genes. In association with selection it can rapidly change gene frequencies.

With such changes going on, one course open to eugenics is to find, and to further, those institutional arrangements, those social, economic and psychological pressures, which would result in a tendency for individuals to have more or fewer children in proportion to their success or achievement in their particular environment. Eugenic policies of this sort would reach into each social, economic and occupational group, and improve the quality of each. The result would be, not a segregation into superior and inferior classes, but a genetic diversification in the process of adapting to the diverse elements of our society. One could then expect a greater variety of talents, and, hopefully, a constantly higher level in those qualities which

have a common tendency towards success in all environments.

Much further research is needed to determine the potential effectiveness of such a selective process, or of alternative eugenic programs consistent with our laws and institutions. It can probably be assumed that couples with a better than average genetic inheritance, will, more often than not, provide a better than average home environment, by whatever criteria quality is to be judged. If this is indeed the case, eugenic policies would work hand in hand with an improved environment to raise the level of human qualities. There is no conflict between those desiring to raise the level of our genetic inheritance and those desiring to raise the level of our social inheritance.

CONCLUSION

The Eugenics Society has a definite and important role to play in the development of population policies within the United States. Where information is lacking, the Society will exert its influence to gain knowledge. Where dissemination of information is poor, the Society will sponsor conferences and encourage publication. And where there is failure to utilize available information, the Society will seek to promote a better understanding of what might be accomplished by the application of existing knowledge.

WARFARE, DEMOGRAPHY, AND GENETICS

FREDERICK S. HULSE

Professor of Anthropology
University of Arizona

ORGANIZED CONFLICT between different social groupings, to the extent of bloodshed, slaughter and the imposition of the will of one group upon the other, is older than history itself. The extent to which such practices were institutionalized among our still earlier ancestors may well be subject to debate. Since data which might bear upon the relationship between warfare and the characteristics of the population for this prehistoric period are lacking, I shall not speculate upon the matter in this paper. However, since warfare does result in the killing of some, and the reduction of opportunities for many, it is of some interest to examine what relation it may have to the numbers, the demographic composition, and the genetic characteristics of various human population groups during periods, and in areas, for which data do exist. To what extent can it be demonstrated that the size, composition and characteristics of social groups, be they labeled bands, communities, tribes or nations, have led to warfare on the one hand, or prevented it on the other? To what extent can it be shown that the practice of warfare has affected the size, composition and characteristics of such social groups? With respect to each of these two questions, it is only proper that indirect as well as immediate consequences should be taken into account, insofar as this is feasible.

Let us first undertake a brief examination of the proposition that the numerical size, age and sex composition or genetic characteristics of a given society have either led to, or prevented, warfare. Certain peoples have, for instance, been characterized as warlike, with the clear and intended implication that this is an hereditary quality, whereas others have been labeled peaceful, or servile by nature. I know of no evidence which either a geneticist or an ethnographer would accept to support either proposition. With respect to age and sex, it is of course true that if, for any reason, the proportion of young adult males in a society happens to be very much less than the average, or than the proportion which such a society had been accustomed to in the past, discretion may substitute for valor until the demographic situation has returned to normal. A generation should ordinarily suffice to bring this about, however. It is also true that a number of societies are known in which warfare does not appear to be institutionalized, and others in which it is quite seriously, not just verbally, deprecated. But neither genetic nor demographic factors appear to be connected with these culture traits.

In considering the question of the actual number of inhabitants of a society in relation to warfare we find ourselves confronted with such terms as "over population" and "population pressure." Perhaps the use of such terms is thought to

be a less crass way of saying "economic motives," for economic motives may frequently be observed, and even more frequently suspected, in warfare among societies of many sorts. A tender conscience may need the assurance that deplorable activities are quite inevitable, that populations explode as naturally as atomic bombs when a critical mass is reached. But this is simply not so. Communities, bands and nations are not composed of plutonium atoms, but of people, and the analogy drawn between them is false.

Many causes have existed for violent conflict between societies, and many excuses have been given, but only in rare instances does the theory of population pressure even appear plausible. The desire to maintain or improve the material comforts to which one is accustomed, on the other hand, can well be a motive for aggressive warfare. No doubt a series of dry years on a steppe will be succeeded by encroachments of one band of nomads on another, or upon their settled neighbors (Musil, 1928). No doubt the desire for a larger hunting territory helped impel the Plains Indians to intertribal war (Newcomb, 1950). It was the better organized, or the better armed, however, who behaved most aggressively, not those who were most hungry. Population pressure appears to be relative to the amount of force at one's disposal, rather than to the numbers of individuals per acre or per unit of food.

Furthermore, by far the greater number of wars recorded in historical and ethnographic literature do not appear to be related to population pressure even in this modified sense. The religious necessity for heads in New Guinea, for sacrificial captives in Anahuac and Ashanti, for converts in the Near East, have been felt to be perfectly adequate justifications for warfare. The social desirability of having extra wives in Uganda, of maintaining slaves on the Northwest Coast and of counting coups on the Plains have been ample excuse to wage war, also. Even when economic motives for warfare are more obvious, pride and prestige have been so commonly involved that such economic advantages as might be secured are frequently neglected. The Buin of Bougainville, ruled by a conquest aristocracy, not only do not seize the lands and possessions of defeated opponents, but pay damages (Lowie, 1948) and the Mohave, although almost constantly in a state of hostilities, do not occupy territory from which they have driven their enemies (Fathauer, 1954). The indubitable fact that, as among the Maori (Vayda, 1956), various Plains Indians (Newcomb, 1950) and many other peoples, such opportunities are seized simply shows that causes and results ought not to be confused. Hoebel (1958) discusses this matter very carefully and concisely, and reaches the same conclusion.

Whether or not there may be demographic causes for war, there might still be demographic results. Motivations, rationalized excuses, or even social functions are rather irrelevant to this question. Do we have evidence that warfare has, as a rule, altered the demographic characteristics of the world's population, or of an important number of peoples? Do we have evidence that it has increased the population of the world as a whole, or of certain tribes? Do we have evidence that, on the contrary, it has tended to reduce population significantly?

If the warfare engaged in is serious, it may well, at least for the time being, alter the age and sex composition. Most peoples expect their young adult males to engage in the most frequent and active hostilities, and this particular group

is therefore bound to suffer the greatest number of casualties from direct enemy action. It would be rash to jump to the conclusion, however, that wars inevitably result in a short supply of this cohort of the population, to an extent that other activities do not. Among many Eskimo groups, for instance, the death rate of young adult males from hunting accidents may be very high even without war. And, in many cases direct enemy action may be taken against all members of a society, rather than against warriors only. Modern technology has of course made such action relatively easier than it used to be, but indiscriminate massacres of enemy populations appear to date back to the Paleolithic. The rock-shelter at Alfalou Ben Rhummel in North Africa contains remains of men, women and children who appear to have been the victims of such a misfortune (Arambourg, *et al.*, 1934).

Direct enemy action, however, on the average, will probably reduce the numbers of males to a greater extent than it will the number of females, since, while both are liable to slaughter at home, the males are also exposed to the hazards of the battlefield or the warpath. Nevertheless, and entirely discounting the occasionally slight rise in the male birthrate (Colombo, 1957) during times of war, a single generation should normally suffice to restore the sex ratio to its prewar state. The case of Paraguay after the war with Brazil and Argentina three generations ago is a case in point (Pendle, 1954). Consequently, we cannot regard warfare as a means of altering the sex ratio unless it be waged more or less continually, or at least during each successive generation.

Furthermore, direct enemy action is far from the only cause of death during, or as a later consequence of, war. The absence of any considerable proportion of the working population is bound to have adverse effects upon production, including food production. Malnutrition opens the way to disease and, as technology improves, any shortage in the working force leads to breakdowns of all sorts. Disease rates, and with them death rates, rise, whatever the technological level of the society may be. Many peoples have, consequently, very sensibly refrained from hostilities until the harvest was in. And many have planned their strategy to attack just before or during the enemy's harvesting season: this was, for instance, the tactic of the Spartans during the Peloponnesian war (Thucydides, 411 B.C.). As a result, the indirect effects of warfare may bear especially hard upon non-warriors, since the warriors have facilities for insisting upon priorities. Contagions frequently sweep through the armed and the unarmed alike since crowded conditions and lack of sanitation always appear to become worse under conditions of war. These spare no one and, in organized states at least, casualties from pestilence seem, with few and very recent exceptions, to cause more deaths than battlefield slaughter.

Without being able to produce numerical data on a world-wide scale, it would seem reasonably certain that the direct and indirect results of warfare on sex and age distribution are, in the long run, negligible. We can turn, then, to the question of whether war might tend to increase population. Is there evidence, for instance, that it stimulates the birth rate to such a degree as to more than compensate for the higher death rate? A few years ago, this might have seemed a fatuous question. An examination of what actually took place during the last great war, however, shows that a continuous

rise in the birth rate, in the United States at least, accompanied and followed the hostilities. Dare we assume that in other times and places, for which vital statistics records are either not so good or nonexistent, the same sequence of events occurred? Probably not, for we do not find such a rise in most of the cases on record. This recent instance, however, should caution us not to assume that warfare of necessity entails a reduction, or even a limitation, upon population. Warfare is waged under so many different circumstances, and with such varying degrees of ferocity, that the formulation of any general rule seems out of the question. The Chinese appear to have continued to increase in numbers during their most recent war with Japan; the Spaniards, during the Civil War of the 1930's, do not seem to have done so.

However, one population often, if not usually, has increased relative to another during and after warfare between them. In many cases this has taken place by the simple expedient of wholesale slaughter. According to A. P. Vayda (1959), in New Guinea some groups have been exterminated by others in the course of a few generations, and it is apparently quite common for a village to be decimated within a few years. Whether the activities of British settlers in Tasmania against the aborigines may be called warfare is debatable, but the Tasmanians were all killed. Genghis Khan's armies, in many cases, systematically massacred the entire population of a captured city, although he is alleged to have turned down the suggestion by some of his followers that all the North Chinese be liquidated, so that their farms might be turned into range land. The Athenians killed only the men after capturing Melos, taking the women and children as slaves, and this seems to have been a not uncommon practice in the wars of the classical period, at least in the literate part of the world. The Yankee settlers in Connecticut killed all 700 Pequots, men, women and children, upon capturing their village in 1637 (Fiske, 1889). These are only illustrative examples to show that in almost all parts of the world, in almost all periods of history, the relative proportions of two societies or populations in conflict have been altered in the most drastic and direct way.

And, of course, nonbelligerent groups may be and have been done away with just as directly during warfare. The fate of Jews under the Nazi regime is a case in point. Other groups which have fallen under suspicion or been used as scapegoats in previous wars have not been eliminated so thoroughly, perhaps, as the objects of the Nazi's wrath, for the latter were most methodical. Whether or not to include such campaigns under the indirect results of warfare is doubtful, since they may be waged during times of peace as well. But the liquidation of potentially hostile groups, whether on so-called "racial" grounds or not, is far from a new practice.

Other indirect results of warfare upon the relative proportions of different societies are numerous. Economic advantages have often accrued to the winning tribe or nation, which make population expansion easier. The United States, for example, was able to open up great areas of land for settlement by the treaties concluded with defeated Indian tribes and bands, as were the British in New Zealand and other places. Since European technology was far in advance of that of the Indians or the Maori, the number of new settlers was from 10 to 100 times greater than the number of aboriginal inhabitants. So, too, whether or not treaties were made, the Spaniards and

Portuguese in parts of Latin America such as Argentina and Brazil, the Dutch and British in South Africa, the Russians in Siberia were able to seize and settle vast territories by waging war against the native populations of those areas. And their numbers, too, became much greater within a few years than those of the previous occupants of the regions in question. It is perfectly true that technology is primarily responsible for such closer settlement; nonetheless, without previous warfare, the more advanced technology would not have been effective in the same manner at all. The successful resistance of the Araucanians in southern Chile (Padden, 1957) to the continued attempts by the Spaniards to open up their land to economic development along European lines illustrates this point.

Even without actual settlement of conquered territories, the increase in population of the winning group at the expense of the loser has, at least in recent centuries, often taken place. Colonial exploitation has supported vast and growing numbers of Europeans since the 16th century. The sub-continent of India appears to have increased its population by not more than five times during the period of its subjection to the British, which was accomplished by warfare. During the same period, the population of Great Britain increased by at least eight times. Since methods of exploitation differ, this sort of result does not always come about: the population of the Netherlands does not appear to have increased as fast as the population of the Netherlands East Indies during the time that the latter existed. However, the industrialized nations of Europe do appear to have increased in population, as a whole, more rapidly than the colonial areas of the world during the heyday of colonialism, most especially during the 19th century, and warfare was the technique employed by Europeans to open up areas for colonial exploitation. In warfare between societies having a much closer approximation to technology, one may question whether the advantages of conquest would result in differential population growth of this sort. The infliction of very severe penalties on losing societies has been far from uncommon, however, and these may have demographic importance. Captives taken in war may be used, as among the Aztecs, as sacrificial victims. The result of this practice, even if not the intention, is to reduce the population of the defeated tribe, village or nation.

Such cases are of course rare. Far more common has been the use of captives as slaves, not in their homeland, but elsewhere. This was the best fate which war prisoners might expect in classical times. The example of Melos has been mentioned: Athenians at Syracuse lost an army of 7,000 men to slavery. As the Roman empire expanded, the slave markets were constantly replenished by fresh supplies of Greeks, Syrians, Gauls, Illyrians, Germans, and the like. And, of course, slaves were always given the most perilous tasks: in the mines, in the galleys, and so on, where life expectancy was low. Even those lucky enough to escape such a fate almost never succeeded in rejoining their own societies, and, apparently, were quite unable to breed rapidly enough to supply the next generation's demands for slave labor. We have no figures from the classical period to quantify this statement, but as I pointed out in a previous paper (Hulse, 1957), such figures do exist for Cuba during the 19th century. They show clearly that captives, used as slaves for hard labor, are not at all likely to reproduce them-

selves. During a period of 70 years, import duty was paid on 571,000 slaves, yet the total colored population at the end of this time had increased by only 438,000. The white population of Cuba had, in the meantime, increased from 107,000 to 793,000. It is true that one may question whether Negro slaves should be properly regarded as war captives. The circumstances of slaves who were war captives could scarcely have been better than were those of slaves who were simply kidnapped, however. In neither case would they have been available to contribute their reproductive potential at home, and in both cases their reproductive capacity in the place of their captivity is very greatly reduced. At times, of course, male captives are intentionally prevented from reproducing by castration. The number of eunuchs required in any society does not appear to have been great, however, nor is emaculation especially related to warfare, except in Ethiopia.

Without the imposition of slavery upon those defeated in war, and entirely aside from any such disastrous conditions as might raise the death rate, it is still possible that economic and cultural disorganization resulting from war might be discouraging enough to depress the birth rate. Indeed, Aristophanes wrote a play on this theme over two thousand years ago. Has Lysistrata's threat ever become effective? Certainly disorganized societies, from that of the later Roman Empire to those of the Marquesas (Linton, 1939), Yap (Hunt et al., 1954) and many other South Sea Islands in recent times have declined in population in part due to a lowering of the birth rate. Whether this may be attributed to warfare is another question. There were already bitter complaints about the falling birth rate in the Roman Empire during times of relative internal peace. War on the border was, of course, constant before, during and after this period. The Marquesans appear to have been fully occupied in fighting each other long before the arrival of Europeans. Indeed, the degree of hostilities between Europeans and natives in the Pacific does not appear to be related at all to the extent of social disorganization and consequent population decline.

It would, on the other hand, appear that the recent dramatic decline in the Japanese birth rate may be directly attributed to the fact that Japan lost its last war. Here, however, we have an example, not of disorganization and discouragement, either on a personal or national level, but of a pragmatic approach to the problems imposed on Japan, not by warfare as such, but by defeat in war. Had Japan won, there would have been no incentive for the nationwide adoption of methods to prevent birth. Japan lost, and the situation thus created could only be met effectively by such action as has been undertaken. Such a rational attack upon a serious problem is rarely to be found by the student of human conduct. If wars in the past have affected demography in just this manner, I have found no evidence of it.

It may be noted that all of the examples cited above refer to particular situations. We have no evidence that the population of the world as a whole has been increased by warfare, nor can we be at all sure that it would be greater had warfare never existed. Rather, certain populations have increased, and others decreased, relative to one another. The demographic results of warfare appear to be of particular ethnographic rather than general ethnological interest. From a genetic and evolutionary point of view, however, the shift in relative proportions

between different populations may assume considerable significance. As I have pointed out in two previous papers (Hulse, 1955, 1957) such shifts have demonstrably altered the gene frequencies of the human species at a number of loci during the short span of history, and very probably did so in prehistoric times. While natural selection in the ordinary biological sense is no doubt at work within each particular population, the most obvious and marked shifts in gene frequencies have been due to the cultural advantages which some populations enjoy to a greater extent than do others. It is, then, of interest to see whether warfare is among the aspects of culture which have been important in stimulating or impeding such shifts in gene frequencies.

If the continued practice of warfare checks population increase which would otherwise occur, we should expect that societies which do engage in this practice would, as time went on, become proportionally less numerous than other societies, and that the meek would indeed, by now, have inherited the earth. This does not appear to have taken place. It is true that prolonged periods of internal peace in a populous society may be accompanied by still further population growth, but the case of Japan under the Tokugawa Shogunate is a well-documented proof that this does not nëtessarily occur. For two and one half centuries, with both internal and external peace, this country increased only from 23,000,000 to 28,000,000; while Great Britain, with a civil war, several rebellions, considerable emigration, and very frequent foreign wars, increased from 4,000,000 to 23,000,000. Whatever effect warfare has had in checking population growth has been far more than counteracted in these cases by other cultural factors.

If warfare is waged between two tribes or nations of rather equal populations and technology, either side may win one time and lose the next, so that no permanent advantage is gained. If, however, a technologically advanced and socially well-organized society wars against one less advanced or organized, it ordinarily wins. The benefits of winning, in a demographic sense, have been explored above. If, furthermore, there are genetic differences between the populations of the two societies in question, the demographic advantage may result in a shift of gene frequencies. There are quite a number of ways in which this can come about, and examples can be given for each.

The first and simplest, of course, is the shift in gene frequencies in the world population resulting from the extinction of certain distinctive groups, such as the Tasmanian aborigines, among others. Such groups have commonly been an insignificantly minute proportion of the world's population. Hitler's attempt to exterminate the much more numerous Jews, although efficiently organized and methodically prosecuted, was not successful. Insofar as this people have any genetic distinctions, a slight but still measurable shift in gene frequencies in the world's population did result from this massacre; however: they lost far more heavily than any other group in the world during the period of 1939-1945. As a rule, however, the victims of slaughters have not been genetically distinctive from their assassins, so far as we can tell —largely because the slaughters have been executed against neighbors rather than peoples living at a great distance. In modern New Guinea, as in classical Greece, wars between neighboring communities, no matter how ferociously waged, cannot be expected to affect gene

frequencies to an appreciable degree, because of this. It has been suggested that the genetically quite distinctive Neanderthal population of Europe was killed off in warfare by technologically superior invaders, but we have no evidence of any sort that this took place.

When warfare has occurred between tribes or nations which were genetically quite distinct, as American Indians are from Northwest Europeans, direct slaughter has, as a rule, been much less effective than the introduction of new diseases in clearing the land. However, since warfare was in fact used to obtain land for European settlement from the Indians, we must include in our list of the genetic changes attributable to war, the substitution of many millions of genes for such characteristics as blondness, baldness, and fine hair, for an indeterminable number of genes for deeper pigmentation, retention of hair, and coarse hair. Populations of European ancestry have replaced non-European populations having alternate genetic characteristics, and extensive warfare was used to facilitate this process. This is one of the most important ways in which the genetic characteristics typical of Europeans have been enabled to attain their present frequency.

Although of course less dramatic, the more rapid rate of population increase among the industrializing countries of Europe in the century after the Napoleonic wars, as contrasted to the areas in Asia and Africa which they continued to seize as colonies during that time, was also a significant factor in the shift in gene frequencies which has taken place since the Renaissance. War as such did not produce this shift, but war was used by European countries to lay the basis from which industrialization arose. The fact that there is now in the world's population twice as high a proportion of genes of European origin as was the case 500 years ago is, in part, and indirectly, a genetic consequence of war.

More directly, the genetic system of any population may be altered by the selection for resistance to new diseases introduced by armies returning home from foreign adventures. The Crusaders are said to have introduced plagues into western Europe when they came back from the Near East. The same allegation has been made concerning Roman Legions which returned to Italy from Syria and Egypt. With the inadequate medical and sanitary conditions of the time, adequate immunity to these new diseases could have been developed only by natural selection. Nor do returning soldiers bring back with them only infections. On many occasions, they have introduced females from foreign lands, either as wives or as sexually available captives. The frequency of the genes for epicanthic eyefolds should be noticeably greater among the next generation in the United States, for instance, than in the past, because of the number of Japanese wives brought home by servicemen. This is a very direct result of war, and we may be sure that it has happened after other wars. The Baganda in East Central Africa made a practice of waging war against neighboring tribes for the specific purpose of collecting extra wives (Roscoe, 1901). Since some of their men must have been killed, but the expeditions were usually successful, a very large percentage of the men were able to be polygynous. If the ethnographic accounts are correct, the resulting gene flow must have been very considerable indeed. A simple calculation shows that if half of the Baganda males succeeded in collecting a foreign wife as well as a local one, and begot an equal number of children with both, it would take only four gen

erations before half of the genes in the Baganda tribe would be of non-Baganda derivation. Since, of course, the Baganda did not go far afield on these adventures, their genetic composition may not have altered to a great degree. Oschinsky (1954) shows that they are almost indistinguishable from their neighbors physically. Yet the extent of heterozygosity among them should have been enhanced, and in any case the potential results of such a social practice are made very evident by this model.

One may be sure that armies stationed for any length of time in foreign lands leave genes behind them when they go home, too. Insofar as warfare involves invasion rather than border forays, the genetic effect of this may also be quite considerable. Candela (1942) attributed the high incidence of blood group B in eastern Europe to the Mongol and other Central Asiatic invasions which were recurrent events for a period of 1000 years after the collapse of the Roman Empire. Certainly the allelic frequency of B rises sharply in the open plains areas where these Asians remained longest, and one also notes an especially high incidence of the same gene in the Andalusian Plain of southern Spain (Mourant, 1954) which was long held by the Arab and Syrian fraction of the Moslem invaders of that country. The weight of the evidence would certainly incline in favor of the thesis that these gene frequencies were raised by the activities of conquering and occupying armies. It is of further interest to note that in most observable characteristics one cannot distinguish many traces of Mongol ancestry among such peoples as Poles, Magyars or Ukrainians. I have often wondered whether sexual selection might have operated against the survival of such Mongoloid traits as could be seen, and against which some prejudice might have developed, whereas no such factor could operate against such a trait as blood type, of whose existence no one was aware.

Armies in modern times have of course gone much further from home than was the case several thousand, or even a few hundred, years ago. The genetic results of soldiers' natural proclivities may therefore be more obvious to us nowadays than would have been the case in earlier times. But any occupation of an area by a group of young males will tend to break through endogamous barriers imposed by local custom, and be among the forces tending to delay or inhibit the establishment of a high degree of genetic homogeneity in any local community. If as has sometimes been the case, they and their offspring remain permanently as aristocracies, instead of going home, their genetic impact upon the areas which they hold will be increased. Bastards left by a departed enemy may be shunned, and find it hard to find mates. The offspring, legitimate or not, of the nobility find fewer difficulties in reproducing themselves. Higher caste and aristocratic groups have often enough owed their origin to conquest in historic times, and in legend as well. It is doubtful whether any of them date from earlier prehistoric times, inasmuch as caste distinctions depend upon a certain degree of technological development. In more recent centuries, however, a number of striking examples of the genetic results of such conquests are available for study.

The creation of the group classified by Coon, Garn, and Birdsell (1950) as the Ladino race is obviously the result of the successful warfare waged by the Spaniards against the Indians of Latin America. The opportunities for spreading the genetic characteristics of Europeans among the local populations of Middle

and South America were ample, and within a very few generations many hundreds of thousands of Mestizos were in existence. Inasmuch as the genetic characteristics of Indians and Spaniards are in many ways quite different, this newly created group is in itself distinctive, although highly polymorphic. The relatively easy access to lower caste females by upper caste males which has existed is of course a function of the caste system itself, and has continued for centuries after warfare ceased. But since the upper caste was created by a war of conquest, we must regard the altered distribution of genetic characteristics, which distinguishes Latin America today from pre-Columbian Latin America as a genetic consequence of warfare.

The fact that actual though not necessarily legal polygyny is usually in practice under conquest aristocracy conditons tends to increase the amount of gene flow from the upper into the lower strata of society. The number of offspring of a single male having such opportunities may be in the hundreds and is often in the dozens. A relatively small group of conquerers, under these circumstances, may have a quite noticeable effect upon the genetic characteristics of a much larger subject population, while males of the subject population do not enjoy opportunities to contribute their genes to the upper caste. Not only in Latin America during the last few centuries, but in Europe after the disintegration of Roman power, in England after the Norman conquest, and undoubtedly in many other times and places, such situations have come into existence. The genetic distinctions which separated the relatively small bands and tribes from northern Europe—Goths, Franks, Lombards, Burgundians and the rest—from the earlier inhabitants of southern Europe were certainly not nearly as great as those between Spaniards and American Indians. Blondness, however, was a notable difference, and even today one finds a greater frequency of this characteristic among the upper classes than among the lower throughout southern Europe, although the difference is not a very great one.

Actual migrations of whole populations sometimes are associated with war, or the threat of war. During the period of the so-called Volkerwanderung many tribes appear to have been on the move, yet Europe was already well enough populated so that this was not, as a rule, accomplished peacefully. Angles and Saxons met resistance upon settling in Britain, Franks when they moved into Belgium and northern France, and so on. They certainly were unable to replace the natives entirely, as happened later in the United States; but on the other hand, the newcomers were much too numerous to be merely a class of nobility. Unfortunately the data available to us are inadequate to demonstrate the extent of genetic change in the areas mentioned which can be attributed to these warlike tribal movements. Since, however, no two breeding populations are identical in their gene frequencies at all loci, any such movement, warlike or peaceful, must produce genetic change to some degree. And, much more often than not, if one tribe attempts to occupy the territory of another, a war will ensue. The spread of the Chinese throughout China, of the Thai into Siam, of the Aryans in India, of the Bantu towards South Africa, and of the Nahuatl into Central Mexico, would all appear to have been accompanied by warfare. But we know even less of what genetic changes resulted from these movements than we do about

the results of the Volkerwanderung in Europe.

Then, too, there have been movements of tribes, or parts of tribes, which have been driven into exile as a result of losing in war. The diaspora of the Jews is a notable example of this, and it certainly introduced at least some new genes into areas as widely separated as the Yemen, Morocco, Northern Europe, and Central Asia. That the Jews in each locality to which they were exiled acquired, by intermating, many of the characteristics of the local population does not alter the fact that their arrival introduced new genetic factors into that same local population. The exile from their homelands of hundreds of thousands of so-called displaced persons as a result of the last World War, of refugees after the previous one, and of other victims of war on many earlier occasions, are other examples, each having a genetic impact to a greater or lesser extent. As distinguished from the voluntary migrations of tribes, the flights of exiles, even in days when transportation was not well developed, often were to great distances, so that the likelihood of settlement among populations genetically very different from themselves existed. As distinguished from the members of a conquest aristocracy, on the other hand, refugees are typically unable to spread their genes at will among the local population. We must assume, I think, that they will produce fewer changes in the genetic system of the population among whom they live than either conquest aristocracies or tribal migrations.

Although a significant factor in reducing the size of the populations from which they were derived, and consequently, of any distinctive genetic contribution to be expected from such populations, captives and slaves will have an even smaller genetic effect upon the area to which they have been taken than any of the three groups mentioned above. Possibly attractive young female captives will be an exception to this rule, but, as was pointed out in a previous section of this paper, the reproductive capacity of such a group is, on the whole, very low. Slavery has been practiced upon such a vast scale, however, first in the Roman Empire and much more recently in the Americas, that its over-all impact upon the distribution of genetic characteristics is very considerable. The fact that approximately one gene out of eight, in the present human population of the Americas, is of African origin is due entirely to slavery. The percentage of those originally enslaved who were war captives is unknown, but the alteration of gene frequencies in America is, to some extent, the result of wars between African societies. In the Roman Empire, too, the involuntary migration of slaves was among the forces which tended towards the creation of a unified gene pool, and it was by war that the slave markets were kept replenished.

The purposeful resettlement of veterans, upon their retirement from military service, in colonies widely distributed throughout the Empire was probably a more effective move in the same direction. From a vast number of mortuary and other inscriptions, we know that Italians were settled in Britain and Syria, Syrians and Africans in Gaul, Thracians in Spain, and Spaniards in Thrace, in settlements where they were able to marry local girls and contribute their genes to the local population. Since the term of enlistment was fourteen years, much of the reproductive potential of these legionnaires had doubtless been disposed of elsewhere. Nonetheless the creation of such colonies should have

served as a means of reducing the extent of genetic differences within the Empire, which was itself the result of a series of wars of conquest.

The practice of resettling whole groups of people, as a precaution against rebellion after or during war, has been practiced on a number of occasions. The Nazi German and the Soviet Russian governments, during the last great war, both moved whole communities about in this way. Long before, the Inca rulers, as they spread their dominion throughout Peru and beyond, used this technique quite methodically (Bram, 1944). It was their habit to establish settlements of their own people at strategic spots throughout their empire, and transfer some or all of the newly conquered ayllus to new settlements at a considerable distance. Since, theoretically, ayllus were endogamous units, this practice ought to have had only a geographical rather than a genetic effect. How complete the endogamy actually was may be open to question. In general, when people are resettled in a new place, genetic interchange with their new neighbors begins to take place sooner or later.

I have listed above, with examples, but unfortunately with all too few statistics, a number of ways in which warfare has actually produced or promoted shifts in gene frequencies, directly or indirectly. Some of the effects have been world-wide, others of only local significance. It will be noted that at no point have I suggested that the practice of war promotes the survival of the fittest, or even serves in any way to select one body-type at the expense of another. Brues (1959) has recently published a paper in which she suggests that the use of some weapons rather than others may have had an effect of this sort. Since for the most part, the weapons concerned were used more in hunting than in war, any selection of this nature which might have occurred cannot be attributed to the practice of warfare. Nor, as noted above, does there seem to be acceptable evidence that any tribe or population is genetically more predisposed to war than any other tribe. Rather, Man's shrewdness and technology have made him the most dangerous creature the world has ever known, but not necessarily the most ferocious.

Thus technology in general, of which warfare is only one aspect, has enabled small bands and whole nations to move and be moved widely over the face of the globe. Genetic adaptations to local environments, which may in early prehistory have led to diversification and the rise of geographic races among us, have become less and less important during the past few thousand years. With the resources of modern culture at his disposal, man can survive and reproduce even though lacking the characteristics which his ancestors would have needed. Warfare, among other cultural institutions, has served to spread genes to places far from the areas where they had positive selective value at one time. The major genetic effect of warfare, then, has been to reduce the degree of genetic differences between different populations.

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JEWISH FERTILITY IN THE UNITED STATES*

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BIRTHS, deaths and migrations are the basic factors of every human society. During the 19th century the population growth of the United States was influenced by immigration as well as by the surplus of births over deaths, but since the cessation of mass migration in the early 1920's the balance of births over deaths has been the dominant force in the growth of the American people.[1] The Jewish group in the United States has fully shared in this change and for nearly 40 years now has not been able to rely on immigration as a prime source of growth. It is the purpose of this report to examine the natural growth of the Jewish population of the United States in recent years.

A number of recent nationwide sample surveys make it possible to analyze the current fertility pattern of the Jewish population, to compare it with patterns of other groups, and to examine some of the factors responsible for the specific fertility of the Jewish population. Earlier descriptions and analyses of the natural growth of the Jewish population, while useful and valuable, were deficient in three respects: they were confined to local communities; they were not designed for the measurement of natural growth and only rarely analyzed it, and they lacked comparability with non-Jewish groups.

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CURRENT JEWISH FERTILITY PATTERN

Nature of the Data

Our description of the current fertility pattern of the Jewish population is based on the results of a nationwide sample survey by the U.S. Bureau of the Census in March 1957 of 35,000 households. Some of the statistical data concerning the religious composition of the American people were published by the bureau under the title, "Religion Reported by the Civilian Population of the United States: March 1957."[2] Since survey results are seriously affected by the way questions are worded and by the nature of the inquiry, it should be emphasized that the Census Bureau's question was "What is your religion?" and that answers were voluntary. (Only 1 per cent of the sample population refused to reply.) The question was designed to elicit a respondent's religious preference or background, rather than church or synagogue membership and attendance, or religious belief. Because Jewish self-identification and identification by others is not based solely on religious adherence to Judaism, but also refers to culture, ancestry, and family background as well, we may reasonably assume that the Census Bureau's question was answered in Jewish terms even by persons not religious in any precise sense.

The Census Bureau's question did not differ from the one customarily used by Jewish communal agencies. It therefore came as no surprise that the sample census confirmed the Jewish population in the United States to be close to 5 million, a figure which had been arrived at independently through a variety of private surveys.[3]

Age Distribution

"What is your religion?" was asked only of persons 14 years old and over, "because some religious groups regard baptized infants as members and others count only persons who have 'joined' at about 12 to 14 years of age or older. This difference would undoubtedly affect the replies for persons under 14."[4] However, the sample survey did enumerate the population under 14 years of age, and a tabulation of this child population by religion of parents was presented. It was thus possible to obtain a complete picture of the age composition of the various religious groups. What was published about the children did not include data on sex, so this writer arbitrarily assigned one-half of the children to either sex. In Table 1 and Figure 1 the age composition of the Jewish population has been compared with that of the white

TABLE 1

AGE AND SEX DISTRIBUTION OF THE JEWISH, WHITE PROTESTANT, AND ROMAN CATHOLIC CIVILIAN POPULATIONS, MARCH 1957

	Total		Male		Female	
	No.	%	No.	%	No.	%
JEWS						
All ages	4,975,000	100.0	2,414,500	48.5	2,560,500	51.5
65 and over	503,000	10.1	230,000	4.6	273,000	5.5
45–64	1,393,000	28.0	698,000	14.0	695,000	14.0
35–44	729,000	14.6	337,000	6.8	392,000	7.9
25–34	660,000	13.3	309,000	6.2	351,000	7.1
20–24	233,000	4.7	127,000	2.6	106,000	2.1
14–19	350,000	7.0	160,000	3.2	190,000	3.8
Under 14[a]	1,107,000	22.2	553,500	11.1	553,500	11.1
WHITE PROTESTANTS						
All ages	93,460,000	100.0	44,812,500	47.9	48,647,500	52.1
65 and over	9,341,000	10.0	4,124,000	4.4	5,217,000	5.6
45–64	20,181,000	21.6	9,611,000	10.3	10,570,000	11.3
35–44	12,899,000	13.8	6,237,000	6.7	6,662,000	7.1
25–34	12,916,000	13.8	6,211,000	6.6	6,705,000	7.2
20–24	5,288,000	5.7	2,325,000	2.5	2,963,000	3.2
14–19	7,850,000	8.4	3,812,000	4.1	4,038,000	4.3
Under 14[a]	24,985,000	26.7	12,492,500	13.3	12,492,500	13.4
ROMAN CATHOLICS[b]						
All ages	42,426,000	100.0	20,635,500	48.6	21,790,500	51.4
65 and over	3,059,000	7.2	1,408,000	3.3	1,651,000	3.9
45–64	8,266,000	19.5	4,042,000	9.5	4,224,000	10.0
35–44	6,407,000	15.1	3,118,000	7.3	3,289,000	7.8
25–34	6,555,000	15.5	3,163,000	7.5	3,392,000	8.0
20–24	2,675,000	6.3	1,209,000	2.8	1,466,000	3.5
14–19	3,707,000	8.7	1,817,000	4.3	1,890,000	4.4
Under 14[a]	11,757,000	27.7	5,878,500	13.9	5,878,500	13.8

Source: *Current Population Reports*, Series P-20, No. 79, February 2, 1958, p. 7, Table 7, p. 8, Table 7.

[a] Children under 14 years old from religiously mixed families are omitted. Children are here assumed to be evenly divided between boys and girls.

[b] Including 774,000 nonwhites.

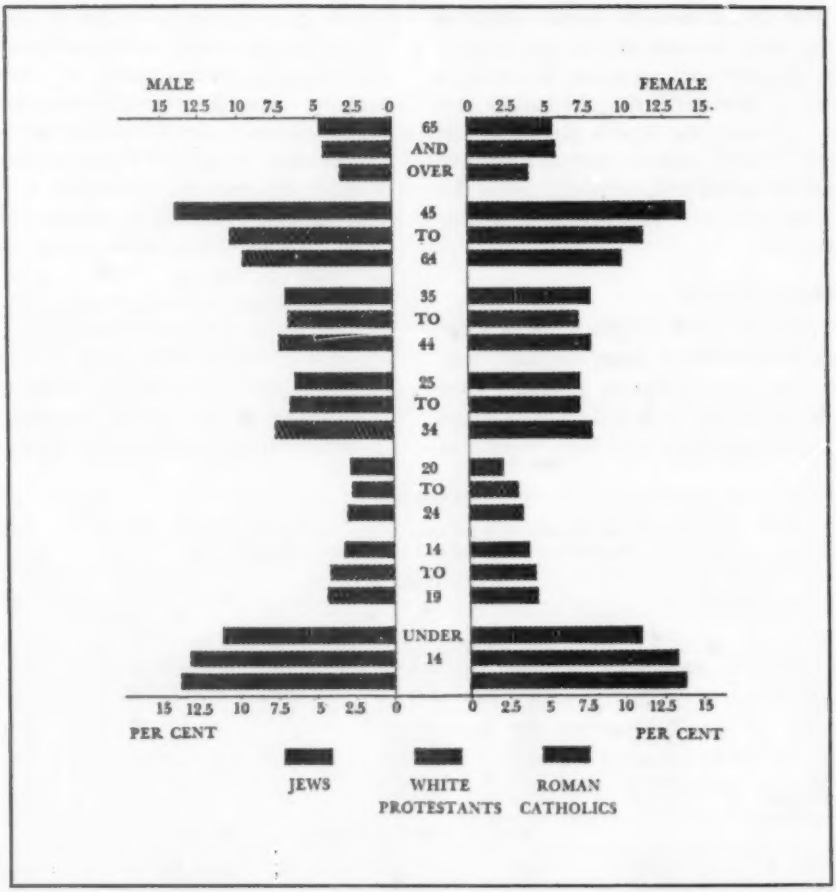

Figure 1. Age and sex distribution of the Jewish, White Protestant, and Roman Catholic civilian populations, March 1957.

Protestant population. Because a separate tabulation for nonwhite Roman Catholics was not available, the Roman Catholic figure includes 774,000 nonwhites.

This tabulation reveals that the Jews in the United States did not participate in the postwar "baby boom" as much as the Roman Catholics and Protestants. Children under 14 years of age constituted 27.7 per cent of Roman Catholics and 26.7 per cent of white Protestants, but only 22.2 per cent of Jews. Thus, in the 14 years between 1943 and 1957 Jewish fertility was 80.1 and 83.1 per cent of Catholic and Protestant fertility, respectively.

The child population in Table 1 includes only children living in households where the parents adhered to a common religion. However, the sample survey indicated that there were about 4 million

additional children from religiously mixed marriages. The writer has arbitrarily allocated such children to the religion of their mothers and added them to the child populations of the appropriate religious groups in order to determine whether this addition effectively changes the relationship between the fertility pattern of the Jewish population and that of each of the other two groups. From Table 2 and Figure 2 it appears that with inclusion of children from mixed marriages, there is a possibility that the fertility of the Jewish population was as little as 73.6 per cent of the Roman Catholic and 79.5 per cent of the white Protestant fertilities between 1943 and 1957.

While there is no other study available which compares the age distribution of the three religious groups for the country as a whole, a 1952 sample survey of New York City, by the Health Insurance Plan of Greater New York (HIP), found that in New York youths under 15 years of age constituted 23 per cent of the Jew-

TABLE 2

AGE AND SEX DISTRIBUTION OF THE JEWISH, WHITE PROTESTANT, AND ROMAN CATHOLIC CIVILIAN POPULATIONS, MARCH 1957
(INCLUDING CHILDREN OF MIXED MARRIAGES)

	Total	%	Male No.	%	Female No.	%
JEWS						
All ages	4,994,000	100.0	2,424,000	48.5	2,570,000	51.4
65 and over	503,000	10.1	230,000	4.6	273,000	5.5
45–64	1,393,000	27.9	698,000	14.0	695,000	13.9
35–44	729,000	14.6	337,000	6.7	392,000	7.8
25–34	660,000	13.2	309,000	6.2	351,000	7.0
20–24	233,000	4.7	127,000	2.5	106,000	2.1
14–19	350,000	7.0	160,000	3.2	190,000	3.8
Under 14 [a]	1,126,000 [b]	22.5	563,000	11.3	563,000	11.3
WHITE PROTESTANTS						
All ages	95,448,000	100.0	45,806,500	48.0	49,641,500	52.0
65 and over	9,341,000	9.8	4,124,000	4.3	5,217,000	5.5
45–64	20,181,000	21.1	9,611,000	10.1	10,570,000	11.0
35–44	12,899,000	13.5	6,237,000	6.5	6,662,000	.70
25–34	12,916,000	13.5	6,211,000	6.5	6,705,000	7.0
20–24	5,288,000	5.5	2,325,000	2.4	2,963,000	3.1
14–19	7,850,000	8.2	3,812,000	4.0	4,038,000	4.2
Under 14 [a]	26,973,000 [c]	28.3	13,486,500	14.1	13,486,500	14.1
ROMAN CATHOLICS [d]						
All ages	44,185,000	100.0	21,515,000	48.7	22,670,000	51.3
65 and over	3,059,000	6.9	1,408,000	3.2	1,651,000	3.7
45–64	8,266,000	18.7	4,042,000	9.1	4,224,000	9.6
35–44	6,407,000	14.5	3,118,000	7.1	3,289,000	7.4
25–34	6,555,000	14.8	3,163,000	7.1	3,392,000	7.7
20–24	2,675,000	6.0	1,209,000	2.7	1,466,000	3.3
14–19	3,707,000	8.4	1,817,000	4.1	1,890,000	4.3
Under 14 [a]	13,516,000 [e]	30.6	6,758,000	15.3	6,758,000	15.3

Source: *Current Population Reports*, Series P-20, No. 79, February 2, 1958, p. 7, Table 4, p. 8, Table 7.

[a] The population under 14 years was assumed to be evenly divided between males and females.
[b] Including 19,000 children from religiously mixed marriages where the wife was Jewish.
[c] Including 1,988,000 children from religiously mixed marriages where the wife was Protestant.
[d] Including 774,000 nonwhites.
[e] Including 1,759,000 children from religiously mixed marriages where the wife was Roman Catholic.

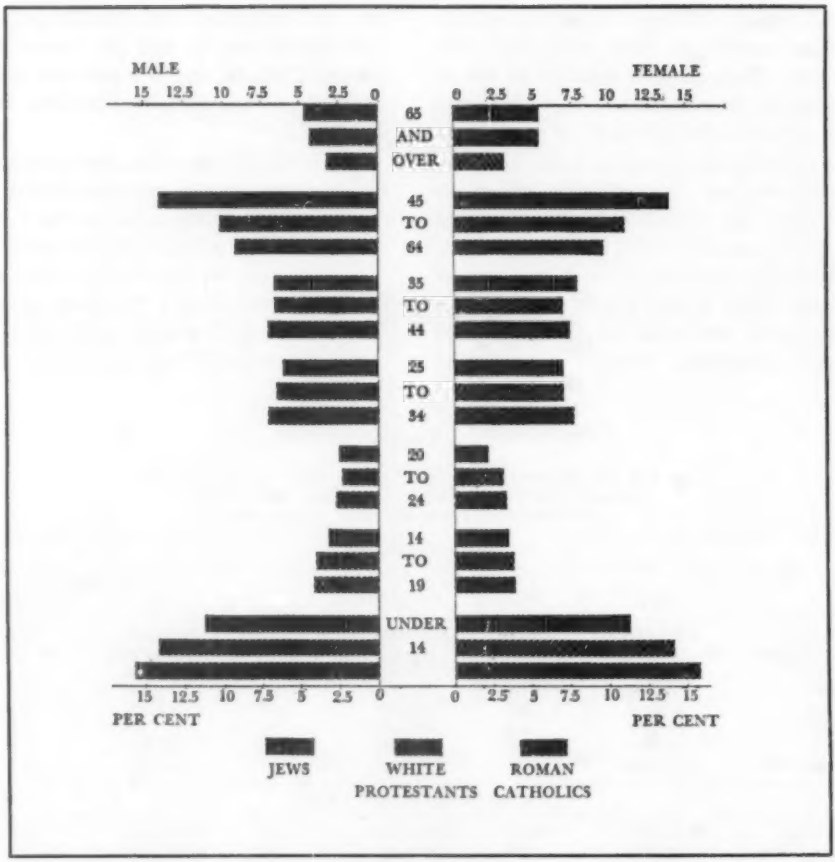

Figure 2. Age and sex distribution of the Jewish, White Protestant, and Roman Catholic civilian populations, March 1957 (including children of mixed marriages.)

ish, 22.2 per cent of the white Protestant, and 27.4 per cent of the white Catholic populations.[5] Comparing these figures with those in Table 2, we see that the proportions of youth in the Jewish population of New York City and of the country as a whole are nearly identical, and of those in the Catholic population very similar. That the proportion of white Protestant youth is somewhat smaller in New York City than in the country as a whole is probably due to the greater degree of suburbanization of white Protestants in 1952.

Fertility Differences by Religion

The difference in relative sizes of youth populations is the first indication that each group has a distinctive fertility pattern. Further and more direct evidence is provided in Table 3, which relates fertility—measured by the number of children ever born per 1,000 women ever married—with a religious affiliation. The

evidence is that the differential between the fertility of the Jewish population and that of the other major denominations was not limited to the 14 years before 1957 but extends much farther back. For the childbearing age (15 to 44) the fertility of Jewish wives was 78.8 per cent of that of (white and nonwhite) Protestant wives and 76.6 per cent of that of (white and nonwhite) Roman Catholic wives. The age group beyond the childbearing age (45 years and over) showed a similar pattern: the fertility of Jewish wives was 80.6 and 72.6 per cent, respectively, of those of Protestant and Roman Catholic wives. Of the two sets of data the set for the completed fertility period (45 years old and over) is the more significant, since the differences recorded for the women still of an age to bear children were influenced by differences in age at marriage, child spacing, and similar factors. The most significant fact revealed by Table 3 is that the fertility of the Jewish women has lagged behind for two generations.

The table also reveals that fertility patterns are not permanent, but are subject to change over time. Comparing the Jewish with the Protestant group, we see that the difference in incomplete or current fertility was greater (21.2 per cent) than in completed fertility (19.4 per cent). The opposite relationship holds true in a comparison of the Jewish with the Roman Catholic group, where the difference in current fertility was smaller (23.4 per cent) than in completed fertility (27.4 per cent).

Further, there are considerable variations of fertility patterns within each group at a given point in time, as shown in Table 4. Among Protestants, Baptists are the most fertile group. Their current and completed fertilities are 6 and 11 per cent, respectively, higher than the average for the country as a whole. Lutherans and Presbyterians are the least fertile Protestant groups recorded. The completed fertility of the Presbyterians is 1 per cent below that of the Jews. The above-average fertility of the Baptists has been attributed to two factors: the first, that about one-third of the Baptists are Negroes, whose fertility is considerably higher than that of whites, and the second, that a large number of white Baptists are rural. By contrast, the low fertility of the Presbyterians has been attributed to urban residence, combined with a high level of education, occupation, and income.[6]

That the Jewish fertility rate is shared or approached by one or two Protestant denominations is a first indication that there may be nothing "inherently Jewish" about it.

The relatively low level of Jewish fer-

TABLE 3

CUMULATIVE FERTILITY RATE (UNSTANDARDIZED) OF MAJOR RELIGIOUS GROUPS (NUMBER OF CHILDREN EVER BORN PER 1,000 WOMEN EVER MARRIED), MARCH 1957

Age of Women	Protestants[a]	Roman Catholics[a]	Jews	Excess[b]			
				P over J		C over J	
				No.	%	No.	%
15–44	2,220	2,282	1,749	471	21.2	533	23.4
45 and over	2,753	3,056	2,218	535	19.4	838	27.4

Source: *Statistical Abstract of the United States, 1958*, p. 41, Table 40.

[a] All races.

[b] P = Protestant rate; J = Jewish rate; C = Catholic rate.

TABLE 4
CUMULATIVE FERTILITY RATE (NUMBER OF CHILDREN EVER BORN PER 1,000 WOMEN EVER MARRIED), BY RELIGION REPORTED, MARCH 1957

Religion	Age		Ratio to Total	
	15 to 44	45 and Over	15 to 44	45 and Over
Total	2,218	2,798	1.00	1.00
Jewish	1,749	2,218	.79	.79
Roman Catholic	2,282	3,056	1.03	1.09
Protestant	2,220	2,753	1.00	.98
Baptist	2,359	3,275	1.06	1.11
Lutheran	2,013	2,382	.91	.85
Methodist	2,155	2,638	.97	.94
Presbyterian	2,001	2,188	.90	.78
Other Protestant	2,237	2,702	1.01	.97
Other, none, and not reported	2,069	2,674	.93	.96

Source: *Statistical Abstract of the United States, 1958*, p. 41, Table 40.

tility in the United States has been observed before, though in a fragmentary manner. Goldberg's findings were limited to the fertility of married women who reported Yiddish as their mother tongue in the 1940 census.[7] More recently for 13 communities surveyed between 1947 and 1950, Seligman found that in each the fertility of the Jewish population was lower than that of the total white population.[8]

SOCIAL DETERMINANTS

It has been know for a long time that different social groups have different fertilities. Size of community (degree of urbanization), home ownership, education, occupation, and income have been found to be key factors. The evidence indicates that racial, ethnic, and religious factors are of secondary importance. Within any religious, ethnic, or racial group there is considerable variation in fertility, depending upon place of residence, home ownership, education, occupation, and income. Conversely, members of different religious groups who are alike in residence, education, occupation, and income display a virtually identical pattern of fertility. The latter forces must therefore be regarded as the basic determinants of variations in fertility.[9]

Residence

Urban-rural difference in fertility is among the oldest and best known of demographic phenomena. The main reasons for the difference are most likely to be found in the greater financial cost and physical difficulty of raising children in an urban environment.[10] In the United States urban fertility seems to have been two-thirds of rural fertility as early as 1810. By 1940 urban fertility had dropped to 56 per cent of the rural rate, but it rose to 71 per cent in 1950.[11]

"Urban" refers to places with a population of only 2,500 as well as to cities with more than a million. Within the urban category, the larger the size of a community, the lower the fertility. This inverse relationship was last observed for the United States in the 1950 population census, which found that the fertility ratio in cities with more than three million inhabitants was only 85 per cent of that in cities with fewer than 250,000.[12]

In these respects, the most outstanding characteristic of the Jewish population and the one that distinguishes it most from the other major religious groups is its heavy concentration in cities. Table 5 reveals that in 1957, 96.1 per cent of the Jews resided in cities, as compared with

TABLE 5
URBAN-RURAL RESIDENCE OF PERSONS 14 YEARS OLD AND OVER, BY RELIGION REPORTED FOR THE CIVILIAN POPULATION, MARCH 1957

Residence	Total Population (%)	White Protestants (%)	Roman Catholics (%)	Jews (%)
United States	100.0	100.0	100.0	100.0
Total Urban	63.9	55.2	78.8	96.1
Urbanized areas of 250,000 or more	36.6	24.5	53.9	87.4
Other urban	27.3	30.7	24.9	8.7
Rural nonfarm	24.4	30.1	15.8	3.6
Rural farm	11.7	14.7	5.4	0.2

Source: *Current Population Reports*, Series P- 20, No. 79, February 2, 1958, p. 7, Table 3.

78.8 per cent of the Roman Catholics and 55.2 per cent of the white Protestants. Furthermore, Jews are concentrated in the larger cities, 87.4 per cent living in "urbanized areas" of 250,000 or more persons, as compared with 53.9 per cent of the Roman Catholics and 24.5 per cent of the white Protestants.[13] Even this fails to indicate fully the degree of Jewish urbanization. Further analysis, as in Table 6, leads to the conclusion that at least 86.6 per cent of all Jews in the United States actually reside in urbanized areas with 750,000 or more inhabitants. This conclusion is supported by independent surveys by the National

TABLE 6
RANK OF URBANIZED AREA, ACCORDING TO POPULATION, 1950, AND ESTIMATED JEWISH POPULATION, 1958

Rank	Area	Total Population, 1950 Number[a]	Estimated Jewish Population 1958 No.[b]	Estimated Jewish Population 1958 Cumulative Ratio to Total (%)
1	New York-Northeastern New Jersey	12,296,117	2,600,000[c]	52.3
2	Chicago	4,920,816	282,000[d]	57.9
3	Los Angeles	3,996,946	390,000[d]	65.8
4	Philadelphia	2,922,470	330,500[d]	72.4
5	Detroit	2,659,398	75,000	73.9
6	Boston	2,233,448	150,000	76.9
7	San Francisco-Oakland	2,022,078	55,000	78.0
8	Pittsburgh	1,532,953	47,000	79.0
9	St. Louis	1,400,058	57,500	80.1
10	Cleveland	1,383,581	88,000	81.9
11	Washington	1,287,333	80,900[d]	83.5
12	Baltimore	1,161,852	80,000	85.1
13	Minneapolis	985,101	20,000	85.5
14	Milwaukee	829,495	30,000	86.1
15	Cincinnati	813,292	25,000	86.6

[a] *1950 Census of Population:* Vol. II, *Characteristics of the Population*, Part I, "United States Summary," pp. 1-29.
[b] AJYB, 1959 (Vol. 60), pp. 13-17. The figures refer to the population in central cities (i.e., exclusive of suburbs) unless otherwise indicated.
[c] Refers to the New York Metropolitan Area and is taken from Henry Cohn, *Jewish Poulation Trends in New York City, 1940-1970* (New York: Federation of Jewish Philanthropies, 1956).
[d] Refers to the metropolitan area.

Opinion Research Center, in 1953 and 1955, which found that 84 per cent of the Jews of the United States live in "standard metropolitan areas" with a population of a million or more.[14] What is more, 52.3 per cent reside in the largest urban agglomeration, the New York area, and 65.8 per cent live in urbanized areas with more than three million residents (Table 6).

Other things being equal, one should reasonably expect that the fertility of the Jewish population as a whole would be closer to that prevailing among all whites in large cities than to any other. This expectation is borne out. Part A of Table 7 shows that Jewish fertility is, indeed, closer to the urban white than to the other three fertilities. While the current Jewish rate is 11 points lower and the completed rate 10 points lower than the respective urban white rates, they are both 21 points below those of the nation as a whole.

Part B of Table 7 shows that with increasing intensity of urbanization the fertility rate declines progressively, but that the current Jewish fertility is 6 points below the rate that prevails in even the most intensively urbanized

TABLE 7

CUMULATIVE FERTILITY RATE (NUMBER OF CHILDREN EVER BORN PER 1,000 WOMEN EVER MARRIED) BY TYPE OF COMMUNITY, YEARS OF SCHOOL COMPLETED, AND LABOR-FORCE STATUS COMPARED WITH NUMBER OF CHILDREN EVER BORN PER 1,000 JEWISH WOMEN EVER MARRIED, MARCH 1957

Characteristic	Unstandardized Cumulative Fertility Rate[a]		Ratio	
	15 to 44	45 and Over	15 to 44	45 and Over
A. Type of community				
Total	2,218	2,798	1.00	1.00
Rural farm	3,009	3,910	1.35	1.40
Rural nonfarm	2,356	3,069	1.06	1.10
Urban	2,035	2,514	.92	.90
Urban white	2,007	2,494	.90	.89
Jews (urban and rural)	1,745	2,218	.79	.79
B. Type of urban community				
Total urban	2,035	2,514	1.00	1.00
In urbanized areas	1,990	2,386	.98	.95
Areas of 250,000 to 1,000,000	1,993	2,410	.98	.96
Areas of 1,000,000 to 3,000,000	1,981	2,367	.97	.94
Areas of 3,000,000 or more	1,877	2,228	.92	.89
Jews (urban and rural)	1,749	2,218	.86	.88
C. Years of school completed				
Total urban	2,035	2,514	1.00	1.00
High school: 1 to 3 years	2,164	2,280	1.06	.91
4 years	1,857	1,923	.91	.76
College: 1 to 3 years	1,748	1,865	.86	.74
4 years or more	1,746	1,498	.86	.60
D. Labor-force status (married, husbands present)				
Urban	2,057	2,375	1.00	1.00
Wife in labor force	1,580	1,950	.77	.82
Wife not in labor force	2,291	2,544	1.11	1.07

Source: *Current Population Reports*, Series P-20, No. 84, August 8, 1958.

[a] Most returns of the 1957 sample survey were standardized for age in order to reduce "the effect of intergroup differences in the distribution by age." (For details see source above, pp. 5,6.) Since returns for the Jewish population were not large enough to permit standardization, the unstandardized rates were used here.

TABLE 8
STANDARDIZED NUMBER OF CHILDREN EVER BORN PER 1,000 WHITE WOMEN EVER MARRIED 15 TO 49 YEARS OLD, BY YEARS OF SCHOOL COMPLETED, TOTAL POPULATION COMPARED WITH URBAN, 1940 AND 1950

Years of School Completed	Nationwide		Urban	
	No.	Ratio	No.	Ratio
1940				
None or elementary	2,521	1.00	2,042	1.00
High school, 1-3 years	1,925	.76	1,648	.81
High school, 4 years	1,460	.58	1,304	.64
College, 1-3 years	1,365	.54	1,225	.60
College, 4 and more years	1,145	.45	1,064	.52
1950				
None or elementary	2,421	1.00	2,065	1.00
High school, 1-3 years	1,948	.80	1,774	.86
High school, 4 years	1,569	.65	1,461	.71
College, 1-3 years	1,479	.61	1,385	.67
College, 4 and more years	1,296	.53	1,262	.61

Source: W. H. Grabill, *et al.*, *The Fertility of American Women* (New York, 1958), p. 201.

areas. Since about half of the Jews of the United States live in the New York area, which in 1950 had a population of over 12 million, and two-thirds live in urbanized areas of 3 million and more, one can justify the conclusion that residence is the most significant factor in the low Jewish fertility. Other factors are examined below.

Educational Attainment of Women

The relationship of women's education to fertility is twofold: while prolonged education depresses women's fertility very considerably, the gains in fertility since 1940 have been most pronounced among women of the highest educational attainment. As shown in Table 8, the fertility of women college graduates was only about half of the fertility of all American women. This was true for the United States as a whole in 1940, 1950, and probably in 1957.[15] It will also be seen from Table 8, however, that the fertility of urban college graduates rose from 52 per cent of the fertility of all urban white women in 1940 to 61 per cent in 1950,[16] and from Part C of Table 7 that the gain continued in 1957 for women of childbearing age. While for women past the childbearing age (45 and over) the inverse relationship between fertility and education was as clear in 1957 as in 1950 and 1940, for women of childbearing age (15 to 44) the inverse relationship became blurred.

Table 7 shows that the cumulative fertility rate of urban women 15 to 44 years old with four years or more of college was 1,746, while the rate for all Jewish women of that age was 1,749. The similarity calls for an examination of the educational attainment of Jewish women.

Table 9 shows that in 1950, 6 per cent of the total population—including both sexes and all races—had had 4 years of college or had also had graduate education. By 1957 the proportion had risen to 7.5 per cent. The percentage of women achieving this educational level rose from 5 per cent in 1950 to 5.7 per cent in 1957.

Table 10, showing the percentage of such women in each of six cities where the Jewish population is concentrated, shows that between large cities the intensity of urbanization does not significantly affect the length of school attendance for women. In Philadelphia, the

TABLE 9
PERSONS 25 YEARS OLD AND OVER WITH FOUR OR MORE YEARS OF COLLEGE, 1950 AND 1957

	Per Cent	
	1950	1957
Total	6.0	7.5
White	6.4	No. Inf.
Nonwhite	2.2	2.8
White female	No. Inf.	6.0
Marital status (All races)		
Female	5.0	5.7
Single	13.3	16.2
Married	4.5	5.2
Widowed	2.7	3.4
Divorced	5.0	

Source: *1950 Population Census; Special Reports: Education*, p. 13, Table B, and *Current Population Reports*, Series P-20, No. 77, March 1957, p. 3, Table C.

TABLE 10
WHITE WOMEN 25 YEARS OLD AND OVER WITH FOUR YEARS OF COLLEGE, IN SELECTED CITIES, 1950

	Per Cent	
City	City	SMA[a]
Philadelphia	3.3	4.7
Chicago	4.4	5.3
New York City	5.2	5.8
Los Angeles	7.1	7.2
San Francisco	7.4	8.6
Washington, D. C.	11.7	12.5

Source: *1950 Census of Population*: Vol. II, *Characteristics of the Population*, p. 116, Table 65.

[a] Standard Metropolitan Area.

TABLE 11
WOMEN WITH FOUR OR MORE YEARS OF COLLEGE, WASHINGTON, D. C., AND SAN FRANCISCO

	Washington, D. C. Standard Metropolitan Area	
Age	% Jews 1956	% Total White 1950
25 and over	22.9	12.5
25 - 44	30.1	14.4
45 and over	11.5	8.7
	San Francisco	
Age	% Jews 1959	% Total White 1950
30 - 44	15.6	8.6

fourth largest city in the United States, only 3.3 per cent of white women 25 years old and over were college graduates, while in San Francisco, the seventh largest city, 7.4 per cent were college graduates.

Although there have been no specific studies of the educational achievement of Jewish women, two recent surveys, one of Washington, D. C. and the other of San Francisco, have provided some material, summarized in Table 11, on the basis of which a tentative conclusion may be essayed:[17] that the ratio of Jewish women who have graduated from college is almost double that of the total white female population. Washington may be unrepresentative, because the large proportion of women college graduates there could be due to the peculiarity of job opportunities in the capital, but the roughly 2-to-1 ratio of Jewish to all white women college graduates obtains in San Francisco as well. The conclusion seems justified that the educational level of Jewish women of childbearing age is comparatively high, and does have a significant effect upon their fertility.

Husband's Occupation

That occupational groups differ considerably in their reproductivity is a fact which has aroused considerable curiosity and anxiety.[18] White-collar workers have fewer children than manual workers and rural residents. (This differential was observed for rural farm, rural nonfarm, and urban areas in 1940 and 1950.)[19] Table 12 shows that the wives of white-collar workers of childbearing age have up to 20 per cent fewer children than the national average, while such women past the childbearing age have had up to 30 per cent fewer children than the national average.

The relatively low fertility of the

TABLE 12

NUMBER OF CHILDREN EVER BORN PER 1,000 WOMEN 15 YEARS OLD AND OVER, MARRIED AND HUSBAND PRESENT, BY AGE OF WOMAN AND MAJOR OCCUPATION GROUP OF EMPLOYED CIVILIAN HUSBAND, MARCH 1957.

Major Occupation Group of Husband	Age of Wife			
	Unstandardized		Ratio	
	15 to 44	45 and Over	15 to 44	45 and Over
Total with employed civilian husband	2,343	2,708	1.00	1.00
Professional, technical, and kindred workers	1,996	1,908	.85	.70
Farmers and farm managers	3,149	4,029	1.34	1.49
Managers, officials, and proprietors, excluding farmers	2,209	2,273	.94	.84
Clerical and kindred workers	1,884	2,270	.80	.84
Sales workers	2,056	2,090	.88	.77
Craftsmen, foremen, and kindred workers	2,353	2,564	1.00	.95
Operatives and kindred workers	2,422	2,791	1.03	1.03
Service workers, including private household	2,277	2,701	.97	1.00
Farm laborers and foremen	3,729	——	1.59	——
Laborers, excluding farmers and miners	2,649	3,337	1.13	1.23

Source: "Fertility of the Population: March 1957," *Current Population Reports*, Series P-20, No. 84, August 8, 1958, p. 11, Table 5.

white-collar groups is a social determinant of great weight in the specific fertility pattern of the Jewish population. Next to urban residence, the second most distinctive sociological attribute of American Jews is their concentration in the white-collar occupations. Community surveys in the late 30's indicated that an average of 76.8 per cent of Jews in the labor force were professional workers, managers, officials and proprietors, and clerical and sales workers.[20] Similar surveys in the late 1940's showed that 84.2 per cent were so employed.[21] Data from national surveys now show that the heavy concentration of Jews in white-collar occupations holds true for the country as a whole. It will be seen from Table 13 that between 1953 and 1955, 78.2 per cent of Jewish heads of households were employed in the four categories comprising the white-collar group, with a concentration of "managers, officials, proprietors" and "sales workers." In each of these categories the proportion of Jews was about three times that of the na-

TABLE 13

OCCUPATIONAL DISTRIBUTION OF HOUSEHOLD HEADS, BY RELIGIOUS AFFILIATION, 1953-55

Occupation of Head of Household	All Religions %	Jewish %	Protestant %	Roman Catholic %
Total	100.0	100.0	100.0	100.0
Professional, technical, and kindred workers	10.0	17.6	9.5	9.6
Farmers and farm managers	10.8	1.3	12.9	5.4
Managers, officials, and proprietors, excluding farmers	12.6	36.0	11.8	11.4
Clerical and kindred workers	6.4	9.6	6.3	7.6
Sales workers	4.8	15.0	4.5	4.6
Craftsmen, foremen, and kindred workers	19.4	7.2	19.2	21.6
Operatives and kindred workers	20.3	12.0	19.7	23.8
Service workers, including private households	7.6	——	7.4	8.6
Farm laborers	2.0	——	1.6	3.0
Laborers, excluding farmers and miners	6.1	1.3	7.0	4.6

Source: Bogue, *op. cit.*, p. 703.

tional average. Again the conclusion must be drawn that the occupational distribution of American Jews depresses their fertility. The 12 per cent of Jewish household heads who were manual workers ("operatives and kindred workers") might be expected to show greater fertility, but they do not. They are most likely to reside in New York, according to a finding that 28 per cent of the Jewish labor force of that city are skilled and unskilled workers.[22] A recent survey of the ninth grade of a Brooklyn, N.Y., junior high school found that there was virtually no difference between Jewish manual and white-collar workers in the size of the family. The average number of children for the white-collar worker was 2.28, that for manual workers 2.32.[23] Admittedly limited, the study allows the inference that for the Jewish population of New York City, occupation does not affect fertility differentials.

This startling propensity of Jewish manual workers to behave like white-collar people in the distinctive and crucial respect of fertility can at least be reconciled with, if not fully explained by, Glazer's conclusion that Jews in the United States have tended to have middle-class values—sobriety, foresight, etc. —even when earning a living as manual workers.[24]

Huband's Income and Family Income

The collection of income data by the Bureau of the Census was started on a limited basis in connection with the 1940 census. Since then, many sample surveys as well as the 1950 census not only have built up a continuous record of the income of Americans but have also made it possible to relate size of income to a number of social and physical characteristics. The 1950 census returns were analyzed in a monograph by Herman P. Miller, who found that incomes tend to increase with size of city, length of education, proximity to the apex of professional status, and increasing age up to 54 years. Nearly all of these factors help explain the relatively high income of the Jewish population.[25]

As a result of the concentration of the Jewish labor force in white-collar fields in the largest urban centers, the median family income of Jewish households is higher than that of the combined membership of Protestant denominations and of Roman Catholics. The Bureau of the Census does not publish income data for the various religious denominations, but sample surveys by the National Opinion Research Center in 1953 and 1955 found that the median family income of Jewish households was $5,954, that of Protestant households $3,933, and that of Roman Catholic households $4,340.[26]

Bogue concludes that "income differentials between religions tend to disappear and become simply differentials between occupations."[27]

If income is such a close correlate of occupation, one should expect an inverse relationship between income and fertility. Most empirical studies have found this to be so, except for the highest-income group, which has a higher level of fertility. The pattern is that of a "J-shaped relation of fertility with economic status."[28]

The excess of total family income over husband's income is most likely to come from the wife's earnings, at the cost of limiting her fertility. Part D of Table 7 shows that urban, married women in the labor force, 15 to 44, have only 69 per cent as many children as women of their age not in the labor force, and women 45 and over only 77 per cent.

Table 14 shows that the one exception to the inverse relationship between

TABLE 14
NUMBER OF CHILDREN EVER BORN PER 1,000 WOMEN 15 YEARS OLD AND OVER, MARRIED AND HUSBAND PRESENT, BY AGE OF WOMAN, HUSBAND'S INCOME, AND TOTAL FAMILY INCOME, MARCH 1957.

Husband's Income in Previous Calendar Year	Unstandardized		Ratio	
	15 to 44	45 and Over	15 to 44	45 and Over
Total	2,350	2,866	1.00	1.00
Under $1,000	2,857	3,829	1.22	1.34
$1,000 to $1,999	2,671	3,414	1.14	1.19
$2,000 to $2,999	2,330	3,044	.99	1.06
$3,000 to $3,999	2,267	2,794	.96	.97
$4,000 to $4,999	2,232	2,403	.95	.84
$5,000 to $6,999	2,306	2,300	.98	.80
$7,000 and over	2,384	2,134	1.01	.74
Family Income in Previous Calendar Year				
Total	2,271	2,785	1.00	1.00
Under $1,000	2,689	3,549	1.18	1.27
$1,000 to $1,999	2,674	3,356	1.18	1.20
$2,000 to $2,999	2,431	2,950	1.07	1.06
$3,000 to $3,999	2,345	2,882	1.03	1.03
$4,000 to $4,999	2,308	2,475	1.02	.89
$5,000 to $6,999	2,217	2,414	.98	.87
$7,000 and over	2,073	2,480	.91	.89

Source: *Current Population Reports*, Series P-20, No. 84, August 8, 1958, p. 12, Table 6.

family income and fertility is in the highest income—$7,000 and over—for women 45 and older. The inverse relationship between husband's income and fertility holds true for all income groups for women past the childbearing age. However, for women of childbearing age the inverse relationship holds true only for incomes up to $5,000, after which fertility rises. Nevertheless, a comparison of the 1957 data of Table 14 with a similar set of data gathered in 1952 shows, during the 5-year interval, "a strong pattern of relatively more children among people with little income than among people with more income."[29] Since the Jews are concentrated in white-collar occupations, which typically bring greater financial rewards, the conclusion must be drawn that the income factor contributes its share toward depressing the level of Jewish fertility.

Jewishness as a Determinant of Fertility

Our step-by-step analysis of the data would make it appear that the religio-cultural complex called Jewishness is not, as has been often theorized, a major factor in the Jewish fertility rate.

Goldberg has repeatedly advanced the thesis that the low level of fertility among the Jews in the United States is due to their status as a minority group.[30] He maintains that because of discriminatory practices, Jews require more education, training, and experience than non-Jews to achieve comparable positions. According to Goldberg, minority status affects Jewish fertility in two ways: it defers marriage, and it keeps children dependent on their parents for a longer period of time because of the need for more intensive preparation for adult careers.

To the extent that differences in fertility levels have here been explained by differences in rural-urban distribution, in the educational attainment of women, and in husbands' occupation and income, Goldberg's thesis is unsupported. Bogue asserts:

> The meager data available gives little evidence either that any religious group is extraordinarily favored, or that there is severe discrimination (independent of any other

factors) against any religious group because of its beliefs—with respect to broad categories of occupational attainment. Although the religious groups differ substantially with respect to occupational composition, in general the members of each religion seem to be located just about as high on the occupational ladder as the level of their educational attainment would lead one to expect.[31]

For Bogue it is clear that education and occupation are "much more potent factors than religious preference in determining the income level of households."[32]

Though the low level of Jewish fertility, accordingly, seems unrelated to discrimination, it may be related to rapid upward social movement. American Jews have successfully tested the promise of an open, democratic society. Glazer found that the "rise in the social and economic position of the Jews has been extremely rapid, far surpassing that which can be shown for any other immigrant group, and indeed surpassing, for the same period, changes in the socio-economic position of long-settled groups."[33] There is some evidence available that the class composition of the Jewish population had approached that of Episcopalians, Congregationalists, and Presbyterians 10 years ago and even earlier. Twenty-two per cent of the Jews were in the upper class, 32 per cent in the middle class, and 46 per cent in the lower, while the corresponding figures for the Presbyterians were 22, 40, and 38 per cent.[34]

A relationship between low fertility and rapid social mobility has been postulated in the theory of social capillarity, according to which a family must be small if it is to rise in the social scale.[35] The Princeton Fertility Study is the first to reveal empirically the operation of social capillarity in the Jewish case, finding that a major factor governing the fertility behavior of the Jewish couples in the sample survey was "a perceived incompatibility between sending children to college and having large families."[36] Low fertility, therefore, has been an important means for rising in the social and economic scale for Jews. Another means has been moving to desirable residential areas.[37]

JEWISH FERTILITY IN CANADA AND GREAT BRITAIN

Low fertility is not limited to the Jews of the United States. The fertility of Canadian Jews is considerably lower than that of the Canadian population as a whole. While the fertility rate of all married women 15 to 49 years old was 168.7 per 1,000 in 1951, the corresponding Jewish rate was only 114.2, or 67.6 per cent as high; in the same year the average size of the Jewish family was 3.2, compared with 3.7 for all Canadian families. The average Jewish family "was the smallest of any among the eight largest groups in Canada."[38] The low fertility of the Jews in Canada is not recent. As early as 1926 the Jewish birth rate was only 70 per cent of that of the total population.[39] A detailed study of the fertility patterns and trends among Jews of Canada between 1931 and 1941 found that the Jewish concentration in urban centers and in white-collar occupations contributed to low fertility.[40]

In Great Britain official statistics do not include data on religious preference or origin, and the demographer must therefore rely on local community surveys and nongovernmental sample surveys. Analysis of the available studies indicates that the Jewish birth rate has lagged considerably behind. The estimated Jewish birth rate for the period 1945-49 was 11.6 per thousand, compared with 16.8 for the total population in the same period.[41]

FAMILY LIMITATION: ATTITUDES AND PRACTICES

The significance of the 1957 sample survey of the U. S. Bureau of the Census for Jewish demography is matched by two recent studies of attitudes toward family planning. The first, the Growth of American Families (GAF) study, was by Ronald Freedman of the Survey Research Center of the University of Michigan and P. K. Whelpton and A. A. Campbell of the Scripps Foundation for Research in Population Problems.[42] The second, the Princeton Fertility Study (PFS), was conducted by the Office of Population Research, Princeton.[43] Some of the findings of the Princeton Fertility Study cited below were taken from a published paper by Charles F. Westoff and an unpublished paper by Robert G. Potter, Jr.[44]

The GAF study found that Jewish couples "expect significantly fewer children (2.4) than either Catholics (3.4) or Protestants (2.9)." In the 12 largest cities included in the GAF sample, Jews and Protestants expected the same average number of births (2.3). The authors therefore attribute the low fertility expectation of the Jewish families primarily to their concentration in large cities.[45] Their low expectations are realized because, as the Princeton study found, consensus about the number of children wanted was greatest among Jewish couples.[46]

The GAF study found that Jewish wives were most favorably inclined toward family limitation—88 per cent expressing unqualified approval, compared with 33 per cent for Catholic and 72 per cent for Protestant wives.[47] A smaller study suggests that comparable differences in attitude exist before marriage, as well. In a group of 222 unmarried women undergraduates between 18 and 23 it was found that 85 per cent of the Jewish women "would consider the use of contraceptives," 58 per cent of the Protestants, and 18 per cent of the Catholics.[48]

Accordingly, the GAF study found that Jews practiced contraception more than the other two groups.[49] Both the GAF and the Princeton studies found that Jewish couples were much more likely to begin contraception at the time of marriage.[50] Of the variety of birth-control techniques available, Jews used the most effective ones.[51] As a consequence, "Jews are much more likely than others to have Completely Planned Fertility."[52] This was complemented by the Princeton finding that "the Jewish rate of contraceptive failure is less than half that of the other religious groups,"[53] confirming that Jews are the most successful in family planning.[54]

Earlier studies had led to similar conclusions. A survey of family planning by patients in urban hospitals east of the Mississippi in the early 30's found a higher proportion of Jews than of others using contraceptive devices,[55] and according to the records of a birth-control clinic in New York City around 1930, a higher proportion of Jewish couples planned pregnancies, used more effective birth-control methods, and used them earlier than couples of other religions.[56]

When Roman Catholic, Protestant, and Jewish couples were recently matched for urban residence, husband's education and income, and wife's education, it was found that similarity of background factors produced a considerable degree of similarity in the fertility behavior of Protestants and Jews. However, this matching procedure failed to diminish the original differences between the Catholics and the other two groups.[57]

FUTURE JEWISH FERTILITY

In view of the low Jewish fertility rate the question must be raised whether past and current fertility levels are high enough to maintain the size of the Jewish population.

Natural Growth

About 20 years ago the net reproduction rate was held to be the best device for measuring the growth of a population, but this measure, which treats current fertility and mortality as constants, has since been found inadequate for societies where birth rates are subject to rapid change.[58] The absence of a specific mortality rate and the effects of intermarriage and of conversions from and to Judaism further complicate estimating a replacement rate for the Jewish population. Bogue's opinion that American Jews "are scarcely reproducing themselves"[59] is supported by a calculation of replacement quotas by the Census Bureau in connection with the 1957 sample survey, which found that on the basis of current fertility and mortality levels, replacement of the white population required 2,130 live births per 1,000 women, single as well as married.[60] While the fertility rate of 1,749 per 1,000 ever-married Jewish women of childbearing age is considerably lower, the hypothetical and static nature of that measure of replacement should be kept in mind.

It appears quite likely that in the future, Jewish fertility in the United States will continue to be influenced primarily by urban residence and concentration in the white-collar occupations, but will be modified by three new factors: the move to the suburbs, satisfaction of the status drive, and new goals of completely planned fertility.

Suburban Residence

The depressive effect of urban residence upon Jewish fertility can be attributed to tenancy (rather than home ownership) and living in the central city. Fragmentary data indicate that Jews in the large urban centers lived in rental multiple-dwelling units rather than in homes of their own until the end of World War II.[61] There are two well-known drawbacks to rearing large families in either walk-up or elevator apartments. One is the considerable physical difficulty of caring for children on levels other than the ground floor.[62] The other is the preference of landlords for tenants with few or no children.[63] The author is aware of only one study where the differential effect of home tenure upon fertility was measured. A survey of Indianapolis in 1941 found "that fertility rates are consistently higher for owners than for renters when rental value of the home is held constant."[64]

Suburbs, on the other hand, have been very hospitable to small children and to large families. An analysis of the 1950 population census found that "as compared with the central-city population, the suburban population has a substantial excess of persons aged 0 to 4 and 5 to 13."[65] Since the Jewish population ever since the end of World War II has been moving into city neighborhoods bordering on suburbs as well as into suburbs proper, and is continuing to do so, it is likely to adopt the higher fertility pattern prevalent there.[66]

Social Status

We have seen that the ambition to rise in the social and economic scale was fulfilled in a relatively brief time, but was probably accomplished at the cost of considerable restriction of fertility. Now that many Jews have achieved this goal or can be confident of moving toward it without encountering major

obstacles, it is conceivable that Jewish fertility will rise. Independently of religious or ethnic factors, in Philadelphia it has been found that people who have achieved their class position themselves have fewer children, on the average, than people who have inherited their position.[67]

Completely Planned Families

That Jews show a more positive attitude toward birth control than other groups and use birth-control methods more effectively could lead to the conclusion that fertility planning itself contributes to the low Jewish fertility in the United States. The following evidence shows that that conclusion may not be warranted.

As we have seen, most studies reveal an inverse relationship between income and fertility, which does not appear to hold for the highest income group. The Indianapolis Study—easily the most significant research project in demography in recent decades, and the first to succeed in sorting out couples by the degree of family planning they had exercised—found that for those couples who had planned their fertility most completely, in numbers and spacing of children, there was a direct rather than an inverse relationship between fertility and socioeconomic status: couples of higher socioeconomic status had a higher fertility than couples of lower status.[68]

Any prediction about the future fertility behavior of the Jewish population must take into account the GAF and Princeton findings that Jews tend markedly toward completely planned fertility. If our assumption of a direct relationship between rapid upward mobility and fertility restriction in the past is correct, it is possible that with further gains in social and economic status the Jewish fertility level will rise. Freedman and his associates found that in response to the question of how many births could be expected for their families to be completed, Jewish couples gave an average number of 2.4. When asked how many children they would have if they could start life over again, Jewish couples gave an average of 3.1. This is also the number of children Jewish couples consider ideal for Americans.[69]

Footnotes

[1]In 1896 Francis A. Walker argued that during a certain period of the 19th century mass immigration contributed nothing to population growth because the gains from immigration were offset by the lowering of fertility of the native population which the process of immigration had induced. Wilson H. Grabill *et al.*, *The Fertility of American Women* (New York, 1958), pp. 103-105.

[2]U. S. Bureau of the Census, *Current Population Reports*, Series P-20, No. 79, Washington, D. C., February 2, 1958.

[3]Erich Rosenthal, "Five Million American Jews," *Commentary*, December 1958, p. 500 and Alvin Chenkin, "Jewish Population in the United States, 1958," AJYB, 1959 (Vol. 60), pp. 3-12.

[4]Paul C. Glick, "Intermarriage and Fertility Patterns Among Persons in Major Religious Groups," *Eugenics Quarterly*, March 1960, p. 31.

[5]Neva R. Deardorff, "The Religio-Cultural Background of New York City's Population," *The Milbank Memorial Fund Quarterly*, April 1955, p. 159.

[6]Donald J. Bogue, *The Population of the United States* (Glencoe, Ill., 1959), pp. 696-97.

[7]For a detailed analysis of these data and a summary of findings from Jewish community studies conducted in the thirties see Nathan Goldberg, "Jewish Population in America," *Jewish Review* (published by the Jewish Teacher's Seminary and People's University, New York), December 1948, pp. 30-55.

[8]Ben B. Seligman, "Some Aspects of Jewish Demography," in Marshall Sklare, ed., *The Jews* (Glencoe, Ill., 1958), p. 67.

[9]P. K. Whelpton and C. V. Kiser, *Social and Psychological Factors Affecting Fertility* (New York, 1945), Vol. I, *passim*.

[10]Wilson H. Grabill *et al.*, *op. cit.*, p. 83.

[11]*Ibid.*, pp. 16-17.

[12]*Ibid.*, p. 89.

[13]"Urbanized area" has been defined as follows: "Each urbanized area contains at least one city with 50,000 inhabitants or more in 1940 or according to a special census taken since 1940. Each urbanized area also includes the surrounding closely settled incorporated places and unin-

corporated areas that comprise its urban fringe. The boundaries of these fringe areas were established to conform as nearly as possible to the actual boundaries of thickly settled territory, usually characterized by a closely spaced street pattern" (*1950 Census of Population:* Vol. IV, *Special Reports*, Part 5, Chapter A, 'Characteristics by Size of Place," p. 6).

[14]Bogue, *op. cit.*, pp. 699-700. Standard metropolitan areas are larger than urbanized areas. In general, urbanized areas represent the thickly settled core of standard metropolitan areas (*1950 Census of Population:* Vol. II, *Characteristics of the Population*, Part 1, "United States Summary," p. 28).

[15]The returns from the 1957 sample survey were tabulated in a slightly different manner, thus preventing a strict comparison ("Fertility of the Population: March 1957," *Current Population Reports*, Series P-20, No. 84, August 8, 1958, Table 4, p. 10).

[16]For the gains in cumulative fertility between 1940 and 1950 among college graduates 20 to 39 years old, see Grabill *et al., op. cit.*, pp. 194-200.

[17]Stanley K. Bigman, *The Jewish Population of Greater Washington in 1956* (Washington: Jewish Community Council, May 1957), pp. 18-19, Tables 2-1 and 2-2, and Fred Massarik, *The Jewish Population of San Francisco, Marin County and the Peninsula, 1959* (San Francisco: Jewish Welfare Federation, November 1959), p. 99, Table 58.

[18]Grabill *et al., op. cit.*, p. 113.

[19]*Ibid.*, p. 130.

[20]Sophia M. Robison, ed., *Jewish Population Studies* (New York, 1943), p. 189.

[21]Seligman, *loc. cit.*, pp. 76-77.

[22]Seligman, "The Jewish Population of New York City," in Sklare, ed., *The Jews*, p. 102.

[23]Erwin S. Solomon, "Social Characteristics and Fertility," *Eugenics Quarterly*, June 1956, p. 101.

[24]Nathan Glazer, "Social Characteristics of American Jews, 1654-1954," AJYB 1955 (Vol. 56), pp. 30 ff.

[25]Herman P. Miller, *Income of the American People* (New York, 1955), p. 39, Table 14; p. 67, Table 30, and p. 54, Table 24.

[26]Bogue, *op. cit.*, p. 706.

[27]*Ibid.*

[28]Wilson H. Grabill, "The Fertility of the United States Population," in Bogue, *op. cit.*, p. 311. For a critical evalution of current theories regarding the relationship of income to fertility see pp. 311-14, *ibid.*

[29]*Current Population Reports*, Series P-20, No. 84, August 1958, p. 3.

[30]For the most recent and most accessible formulation of this thesis see Nathan Goldberg, "The Jewish Population in the United States," in *The Jewish People Past and Present* (New York, 1948), pp. 28-29.

[31]Bogue, *op. cit.*, p. 704.

[32]*Ibid.*, pp. 707, 708.

[33]Glazer, "Social Characteristics of American Jews, 1654-1954," *loc. cit.*, p. 29.

[34]Liston Pope, "Religion and the Class Structure," *Annals of the American Academy of Political and Social Science*, March 1948, p. 86.

[35]Charles F. Westoff, "The Changing Focus of Differential Fertility Research: The Social Mobility Hypothesis," *The Milbank Memorial Fund Quarterly*, January 1953, pp. 24-38; reprinted in Joseph J. Spengler and Otis Dudley Duncan, eds., *Population Theory and Policy: Selected Readings* (Glencoe, 1956), pp. 400-09.

[36]Charles F. Westoff, "The Social-psychological Structure of Fertility," *Proceedings, International Population Conference* (Vienna, 1959), p. 363.

[37]Erich Rosenthal, "Acculturation Without Assimilation? The Jewish Community of Chicago, Illinois," *American Journal of Sociology*, November 1960, pp. 275-88.

[38]Louis Rosenberg, "The Demography of the Jewish Community in Canada," *Jewish Journal of Sociology*, December 1959, p. 227.

[39]*Ibid.*, p. 226.

[40]Mortimer Spiegelman, "The Reproductivity of Jews in Canada, 1940-1942," *Population Studies*, December 1950, pp. 299-313.

[41]Hannah Neustatter, "Demographic and Other Statistical Aspects of Anglo-Jewry," in Maurice Freedman, ed., *A Minority in Britain* (London, 1955), p. 82.

[42]Ronald Freedman, Pascal K. Whelpton, and Arthur A. Campbell, *Family Planning, Sterility, and Population Growth* (New York, 1959).

[43]Charles S. Westoff, Robert G. Potter, Jr., Philip C. Sagi, and Elliott G. Mishler, *Family Growth in Metropolitan America* (Princeton, 1961).

[44]Charles F. Westoff, "Religion and Fertility in Metropolitan America," in *Proceedings of . . . Milbank Memorial Fund: Thirty Years of Research in Human Fertility: Retrospect and Prospect* (New York, 1959), pp. 117-34, and Robert G. Potter, Jr., "Fertility: A Multi-dimensional Analysis," paper presented at the April 1960 meeting of the Eastern Sociological Society.

[45]Freedman *et al., op. cit.*, p. 287.

[46]Potter, *loc. cit.*, p. 9.

[47]Freedman *et al., op. cit.*, p. 161.

[48]Victor A. Christopherson and James Walters, "Responses of Protestants, Catholics, and Jews Concerning Marriage and Family Life," *Sociology and Social Research*, Sept.-Oct. 1958, p. 21.

[49]Freedman *et al., op. cit.*, p. 104.

[50]*Ibid.*, p. 110, and Potter, *loc. cit.*, p. 5.

[51]Freedman *et al., op. cit.*, pp. 178-80.

[52]*Ibid.*, pp. 112-13. Completely Planned Fertility has been defined as follows: "The couple used contraception regularly and conceived only when they stopped it for that purpose," p. 78.

[53]Potter, *loc. cit.*, p. 6.

[54]Westoff, *loc. cit.*, p. 123.

[5]Raymond Pearl, *Natural History of Population* (New York, 1939), p. 241.

[56]Regine K. Stix and Frank W. Notestein. *Controlled Fertility* (Baltimore, 1940), p. 29.

[57]Ronald Freedman, P. K. Whelpton, and John W. Smit, "Socio-economic Factors in Fertility Behavior Differences Among Protestants, Catholics, and Jews," *Population Index*, July 1960, p. 206.

[58]George J. Stolnitz and Norman B. Ryder, "Recent Discussion of the Net Reproduction Rate," in J. J. Spengler and O. D. Duncan, eds.,

Demographic Analysis (Glencoe, 1956), pp. 147-61.

[59] Bogue, *op. cit.*, pp. 696-97.

[60] Bureau of the Census, "Fertility of the Population: March 1957," *Current Population Reports*, Series P-20, No. 84, August 1958, p. 4.

[61] In Chicago, for example, only about 15 per cent of the Jewish population lived in "owner-occupied" dwelling units in 1940: Otis D. Duncan and Stanley Lieberson, "Ethnic Segregation and Assimilation," *American Journal of Sociology*, 1959, p. 371. In Chicago, neighborhoods "which had the highest Jewish density had the highest proportion of multiple-dwelling units, while, conversely, neighborhoods with the lowest Jewish density had the smallest proportion of such units": Erich Rosenthal, "The Jewish Population of Chicago," in Simon Rawidowicz, ed., *The Chicago Pinkas* (Chicago, 1952), p. 86.

[62] It may be that before the end of World War II parked and moving cars did not so congest residential streets as to be a major deterrent to apartment-house living.

[63] A formal study of landlords' discrimination against families with children does not seem to exist.

[64] P. K. Whelpton and C. V. Kiser, *Social and Psychological Factors Affecting Fertility* (New York, 1945), Vol. I, p. 18.

[65] Otis D. Duncan and Albert J. Reiss, Jr., *Social Characteristics of Urban and Rural Communities, 1950* (New York, 1956), p. 120.

[66] For the suburban migration of the Jews of Chicago see Esther Beckenstein, *Report on Jewish Population of Metropolitan Chicago* (Chicago: Jewish Federation of Philanthropies, May 1959); for New York see Henry Cohn, *Jewish Population Trends in New York City, 1940-1970* (New York: Federation of Jewish Philanthropies, January 1956) and C. Morris Horowitz and Lawrence J. Kaplan, *The Estimated Jewish Population of the New York Area* (New York: Federation of Jewish Philanthropies, 1959-.

[67] Westoff, "Changing Focus of Differential Fertility . . . ," *loc. cit.*, p. 407.

[68] Whelpton and Kiser, *op. cit.*, Vol. II, p. 394.

[69] Ronald Freedman, P. K. Whelpton, and John W. Smit, "Socio-economic Factors in Religious Differentials in Fertility," *American Sociological Review*, August 1961, Table 1, p. 610.

Brief Reports and Communications

COMMENT ON GORDON ALLEN'S REVIEW OF PUTNAM'S RACE AND REASON

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MY ATTENTION has been called to a review of Carleton Putnam's *Race and Reason* in your issue of June 1961. This review, by Gordon Allen, challenges my judgment, and that of three other scientists, in signing the introduction to Putnam's book. I note that Allen places our names in parentheses followed by an exclamation point, but whether this is to emphasize his astonishment at our signatures, or his courage in setting his opinion against that of Ruggles Gates, one of the world's leading geneticists, I am unable to say.

In any case, the review makes an answer both fitting and necessary, although I am unable to meet all of Allen's objections because of the generalities in which they are couched. It is impossible to reply to the allegation that "many of [Putnam's] arguments vanish into thin air when properly phrased in terms of trait frequencies," because Allen offers no proof. When Allen writes that "some inconsistencies in Putnam's argument must be passed over," the answers must be passed over, too. And when Allen remarks that "if accidents of climate and geography could be ruled out, and they cannot . . ." [without considering Putnam's careful analysis of why, in the case under debate, they can] one is compelled to say that in our opinion Allen is mistaken and that an unbiased reading of *Race and Reason* will sustain this opinion.

There are only two criticisms of Putnam's book which Allen attempts to support with any argument. One of these has to do with what he alleges to be Putnam's confusion of the terms "average" and "frequency" in scientific usage. Allen relates this supposed confusion to what he calls Putnam's "failure to analyze the race problem in terms of individual human beings." However, *in the context in which Putnam uses it* and for the purposes of this debate, "average" need not be distinguished from "frequency." It makes no difference whether we say, on the one hand, that the frequency with which good tacklers are found on the Yale football team exceeds the frequency with which they are found on the Harvard team, or whether we say, on the other hand, that the average Yale player is a better tackler than the average Harvard player—provided we emphasize that we are *not* attributing exceptional ability to any individual player. Putnam is at pains throughout *Race and Reason* to distinguish between racial and individual traits, and it seems to me pure pedantry for Allen to assert that "a scientist uses averages in some contexts, frequency in others, and the two are rarely if ever interchangeable." The distinction is quite immaterial here.

Of course, what Allen is actually trying to suggest is that only individuals matter in the process of racial interbreeding, that "marriages are contracted between individuals, not between races," and that in consequence only the individuals need be considered—that we need only ask, "Is this *particular* player a good tackler?" Allen makes the startling statement: "With respect to the sort of hereditary variations that might influence adaptation to civilization, an individual's manifest traits are the best guide to his genotype." This assertion in effect negates the influence of heredity, except as it may express itself in one individual in one generation. It assumes that the brilliant son of a stupid father may not in turn have a stupid son—a position which no trained geneticist would accept.

Perhaps Allen expects to give his assertion plausibility by his phrase "with respect to the sort of hereditary variations that might influence adaptation to civilization," but I must point out that the fissuration of the frontal lobes is just as much a matter of heredity as is skin color.

Contrary to Allen's view, I find no implication in *Race and Reason* that "each individual carries the genetic qualities of his entire race." Putnam infers, rather, that he carries enough of them to perpetuate a pattern, and that while this pattern may be diluted by an out-marriage, the result is dilution only, not escape. Moreover, we may well say that when blacks and whites marry in sufficient numbers the races as well as the individuals marry, and that the frequency of all Negro traits in the resultant mixture must be reckoned with. The best proof of this pudding is in the eating. Putnam's classic statement, "there has never been a case on record where a white and black civilization interbred without deterioration of the white civilization," speaks louder than any scientific splitting of hairs.

I come now to Allen's second point. Allen feels that Putnam overemphasizes the importance of the traits which distinguish a race capable of sustaining Western civilization from a race in the Congo. Allen remarks, "an extremely small average [sic] difference between the whites and Negroes, meaning a slightly higher frequency [sic] of receptive *individuals* [did Allen mean to use the words interchangeably here?] would suffice to explain the northward movement of civilization, if other circumstances could not be found to account for it." Leaving aside Allen's implication that other circumstances *can* be found to account for it, which Putnam has disproved, we must recognize that great results often spring from small impulses, whether in an acorn or in the frequency of individual receptivity in a race. All this is to assume that Allen is correct when he states that the difference in frequency is actually slight. He does not attempt to prove it. He offers no facts to show that Putnam is wrong when he suggests that the difference between Europe and Africa is indeed a *measure* of the difference.

We must note also that if Allen is correct in the slightness of the difference, this fact makes all the more hazardous the interbreeding of the races. Allen, by his argument for his second point, destroys the foundation for his first point. Even a slight decrease in the frequency of receptive individuals among us in future generations may well reverse the progress from barbarism to civilization.

Allen begins his review with the statement that *Race and Reason* is "dangerously persuasive" and ends with the remark, "this is a book to beware of." I

would agree that it is persuasive—and dangerously so to the equalitarian cause. But I would say that only those need beware of it who desire to continue dreaming in an unreal world. In my judgment it is high time that all of us aroused ourselves before our blunders at home and abroad become disastrous.

Reply to Garrett Concerning Putnam's Race and Reason

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I MAY BEGIN where Garrett ended. Putnam's book is dangerous not because it may upset what Putnam fairly labels "equalitarian dogma," but for the opposite reason. Natural scientists in this generation are reexamining the question of genetic racial differences with new and more open minds. The glib propagation of specious arguments threatens to fog the issues again and to perpetuate emotional controversy at the expense of scientific investigation.

Garrett has raised eight points, some repeatedly, and I will take them up in logical order.

1. My use of an exclamation point following the names of the four scientists (Gates, Garrett, Gayre, and George) referred only to the strange alliterative coincidence.

2. The statement for which, according to Garrett's second paragraph, I offered no proof, was the theme and the introduction for my review, nearly all of which was offered as "proof" (in Garrett's usage) of that statement.

3. Putnam's so-called careful analysis showing that accidents of climate and geography do not explain cultural retardataion in Africa is confined to two paragraphs, although he repeats his conclusion again and again. Present knowledge bearing on this issue could easily fill a large volume. As long as alternative explanations can be raised, cultural retardation in Africa fails as a convincing demonstration, let alone proof, of racial inferiority.

4. The concept of averages could not be less appropriate than in just the context where Putnam uses it, and Garrett's football teams illustrate the point perfectly. In an integrated society, races are not pitted against each other like teams. Just to the extent that they mingle, their individual contributions rather than the averages determine the success of the resulting society. For example, segregation might serve an economic function if all Negroes were distinguished from all Whites by a difference in IQ as great as the reported average, but the frequency distributions overlap widely and any barrier to occupational mobility impairs efficient use of manpower.

My parallel phraseology in terms of *average difference in receptivity* and in terms of *relative frequency of receptive individuals* in Europe and Asia did use the words interchangeably just to emphasize the consequences. An "average" superiority" conveys the impression of universal superiority not required by the hypothesis. I might have added that, given a few key individuals and high variability, Europeans as a society could have been more receptive even if their average receptivity were lower, but this probably is splitting hairs.

5. As to the inferred difference in receptivity, the burden of proof is on Putnam if he asserts that his evidence demonstrates a large difference. His position is untenable if his evidence can be satisfactorily explained by assumption of little or no difference.

6. Garrett makes one rather telling point here. It does not really matter whether the genetic difference between Africans and Europeans was small or large. If a difference existed and if it explains the disparity in the two civilizations, then it was an important one. But this hangs upon two if's, and what *was* important in the gradual acquisition of civilization 4,000 years ago may not now be important in promoting evolutionary advance of civilization. Admittedly, race mixture is hazardous in the sense that we cannot predict all the consequences, but neither can we predict all the consequences of continued segregation in a changing world order.

7. To a nongeneticist there is doubtless something startling in my statement that, with respect to some variables, an individual's manifest traits are the best guide to his hereditary potential. Laymen are impressed by the mysterious way in which recessive hereditary characters crop out in offspring of normal individuals, but the sort of hereditary variations concerned with adaptability to civilization seem to be quantitative or continuous in character. With respect to such traits gene effects are mainly additive.

Consequently, a geneticist would have more hope of an intelligent third generation if shown a stupid father and a brilliant son than if shown a brilliant father and a stupid son. A child receives half of his father's genes, only a quarter of his grandfather's. This process, appropriately called dilution by Garrett, is irreversible, and unless the parents are related, the grandchild can never have more of its grandfather's genes than the father had.

8. To focus this argument on interracial marriage: If a Negro lacks certain genes common in his race, and he and his descendants all marry Whites, those particular genes will not occur among his descendants unless contributed by the white marriage partners.

Admittedly, if blacks and whites marry *in sufficient numbers*, all racial traits will be blended in the resulting population. But in requiring "sufficient" numbers, Garrett is setting his conclusion as a condition. Actually, if only a few per cent of Negroes marry Whites in each generation, these marriages are likely to be highly selective. To the extent that unintelligent Whites may marry intelligent Negroes, the White race stands to gain by accepting the mulattoes.

Finally, on this point, Garrett says the best proof of the pudding is in the eating, and he quotes Putnam on this proof. The particular quotation is indeed "classic," but only for its vulnerability. It refers to cases *on record* of *interbreeding* white and black *civilizations*. Do the historical records he has in mind lend themselves now to time-sequence analysis of the essential steps, immigration, integration, intermarriage and deterioration? Were the matings assortative? These and other ambiguities are beyond resolution and it is impossible to transfer more than very tenuous inferences from the historical events to America's present problems. If this is the best proof for Putnam's case, then certainly the equalitarian cause will triumph.

DISCUSSIONS ON THE TEACHING OF GENETICS TO MEDICAL STUDENTS

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IN OCTOBER 1961 at the Rockefeller Institute a one-day conference was held on teaching genetics to medical students. The conference was organized by the medical genetics committee of the American Eugenics Society and sponsored by the Population Council. Invited participants represented 33 medical schools mainly in the northeast section of the United States. Those attending were appointed by the deans of the various schools and, in most cases, were the two individuals in each institution most directly concerned with the problem under discussion.

Opening the discussion, Dr. Helen Ranney, of the Albert Einstein Medical College, presented an analysis of responses to a questionnaire that had been completed by the participating institutions. The questionnaire pointed out the variety of approaches in handling the subject and the almost unanimous recognition that the need exists for improving the handling of the subject. Dr. Ranney indicated that several schools already include genetics in the curriculum and that many others are in the process of organizing courses.

The formal course given in the first year at the Albert Einstein College of Medicine was described by Dr. Salome Waelsch. She emphasized her belief that formal courses should be included with the pre-clinical curriculum. Dr. Waelsch told the conference that the idea in such a course is not to train geneticists but to bring students to the point of understanding the problems of genetics. They should be introduced to the basic principles and taught how to handle the literature. In her terms they should be "sensitized" to genetics and introduced to the dynamic nature of the field. She indicated that in the practical problem of organizing course material, embryology and genetics form a very natural grouping and the combination provides many examples to illustrate the dynamic aspects of genetics. As long as pre-medical students are not expected to have a basic genetics course, she believes, it is preferable to teach mouse genetics rather than phage, maize, or drosophila genetics. In addition, Dr. Waelsch shows the first-semester students genetic cases. There is no laboratory but groups of ten are given projects to complete. The book used is Stern's "Principles of Human Genetics."

Dr. Werner Maas discussed the formal course that is given at New York University College of Medicine. It comes in the second semester of the first year which is after the students have begun biochemistry. Dr. Maas stressed that the primary purpose of the 13 two-hour lectures is to present basic principles of genetics. They are illustrated with experiments, some of which are done with microorganisms. For example, a pneumococcus transformation is used as an excellent means to illustrate that DNA is the genetic material; E. coli illustrates the linear nature and continuity of genetic material. Dr.

Maas believes that the important concepts of mammalian genetics such as inborn errors of metabolism and gene-enzyme relationships are best illustrated with the use of microorganisms. In brief, it may be said that the genetics of microorganisms plays an extremely important role in his method of teaching genetics to medical students.

Dr. William Young who teaches a formal course in the principles of genetics at Johns Hopkins Medical School described his approach. An objective in his course is to "sensitize" the students to the analytic method of genetics. He finds that 40% of his students have had a previous course of genetics in undergraduate school. Dr. Young uses a lecture-seminar system which gives the students a total of 45 hours.

The course at Harvard Medical School was discussed by Dr. Claude Villee. In the past, they have had 12 hours to present Mendelian, population and biochemical genetics. Recently, Dr. Villee and Dr. Don Fawcett have started a 25-hour integrated course in embryology and genetics. It is their experience that about one third of the students will have had a previous course in genetics. Like several other schools represented, Harvard uses Stern as the textbook. The students are not taught microbial genetics until the second year when the subject is handled in microbiology. It is Dr. Villee's strong conviction that a formal course in genetics should be given and that it should be in the first year.

In the discussion that followed several important points were raised. There seemed to be agreement that there is a problem in having genetics accorded proper recognition by the students. In other words, how can the subject achieve status so that the students will take the course seriously. There was general agreement that although this is a problem it should not be necessary to create a new department. It was pointed out that if the various courses in the curriculum continue to teach their specialized aspects of genetics, the students will soon take the formal course seriously, particularly if it is helpful to them in performing better in other courses. On the prestige question, Dr. McKay of the University of Vermont suggested the interesting device of starting the medical school year with three to five days of concentrated genetics material which would be mainly an introduction to the terminology. Several of the participants suggested that if the school intends to teach a basic genetics course it should call upon an undergraduate school instructor for this purpose. It was pointed out, however, that this would act negatively in the prestige problem and that, in fact, the best way to add prestige to the course is to have the instructor lecture with a stethoscope hanging from his pocket. Dr. Johnson of Howard University raised the important issue of availability of instructors to handle a first-year formal course in genetics. He was advised that approaches could be made to departments of genetics in graduate schools and the few existing in medical schools. Dr. McCauley of the National Institutes of Health reported that this government organization now has 34 genetics training programs and that they will be producing trainees in a short time.

At the beginning of the afternoon session some comments were made on the series of genetics films distributed by the McGraw-Hill Company. There was some opinion that students do not react well to the films while others believed that the films could be helpful if used properly. There was no dissension to the principle that the films could not be used as

a substitute for a live course but could be helpful for review. Most of the afternoon was devoted to the problem of linking the formal teaching of genetics with medical genetics of the clinical years. Dr. Victor McKusick of Johns Hopkins Medical School addressed himself to this point. He believes that pathology could contribute much more than it does now. Dr. McKusick pointed out that, "the mutant gene is one of the major etiologic factors in disease." At Hopkins, he gives two lectures in the pathology course. Although there are no lectures in the third and fourth years, clinics are held weekly in which the patients are presented by students. Much of the teaching of clinical genetics is done at the bedside which means that the problem of teaching may really begin with engaging the interest of the faculty. At Hopkins, they have given much status and prestige to genetics by bringing in a series of well-known geneticists for popular lectures. This has been stimulating to the students and faculty alike. Both research conferences and journal club meetings are part of the genetics scene at Hopkins. Following Dr. McKusick's discussion, Dr. McKay emphasized that most schools are faced with an immediate problem in filling the gap between pre-clinical teaching of genetics and clinical application. He pointed out that one must not only make the students interested in the subject but must keep them interested throughout their medical curriculum and their medical careers. An important asset of having a first year course is that the students can be assured of someone with whom to consult on basic genetic matters when in the third and fourth years they are confronted with clinical genetic problems. At Vermont they maintain a lecture series for third year medical students and several of these are reserved for topics in genetics. Dr. McKay raised the question of the role of hereditary counseling in the over-all approach to genetics teaching, and indicated that attempts are being made at his school to emphasize this aspect. It was generally agreed, however, that the extent to which genetic counseling is emphasized in various schools will depend on the interest and the approach of the various faculties.

In this connection, Dr. McKusick described the formal genetics course at Bar Harbor (described in *Eugenics Quarterly*, **8** [2]: 98-101, 1961). The student body is drawn from faculties of medical schools. The objectives are to upgrade genetics, to stimulate research and to recruit talent. The faculty is composed of the Bar Harbor group of geneticists, some of the Hopkins faculty and six outside lecturers.

Finally, some important points were made which brought into perspective the role of genetics in the over-all medical curriculum. Dr. Nichols of Harvard reminded us that much is expected of students nowadays and each specialized interest can find enough justification to exaggerate the importance of its own topic. The medical educator must evaluate carefully just how far one can make inroads into the established curriculum as new disciplines emerge and reach a stage of development. Other participants raised the perennial problem that faces the teacher; does one direct his lectures to the potential researcher or to those who will devote their careers to clinical practice exclusively? Dean Hayman of Tufts advised wisely that students be taught and influenced without establishing rigid career patterns but so as to leave pluri-potentiality. The session closed with general agreement that a similar discussion might be useful at some time in the future.

Genetic Counseling

Genetic Counseling: At the Minnesota State Board of Health

With the recent advances in biochemistry, cytogenics and other fields of human biology, our understanding of human heredity and disease has increased many fold in the last 15 years. Some of the inherited diseases have been found to be due to certain metabolic defects. A great many of these have been studied carefully, and the site and type of defect has been determined. In several cases such as phenylketonuria and galactosemia a dietary treatment has been found which may prevent the clinical symptoms and permit development of a normal individual. The discovery of a cytological technique by which the chromosomes of man may not only be counted but may be differentiated has given us insight into the causes of many diseases such as mongolism, Klinefelter's, Turner's syndrome and certain undifferentiated abnormalities. Our understanding of the human blood group systems, the haptoglobins, the transferrins, and the hemoglobins have also done much in pinpointing exactly where genetic defects occur. The inheritance of many of the congenital malformations has been closely studied and much has been learned about the degree of inheritance involved in these as well as related anomalies. In various psychiatric diseases we are beginning to understand the interacting roles that heredity and environment play in the production of these diseases. Thus with these new tools and the information which they have provided for us, we are now in a position to give more precise information to families who seek counseling with respect to the inheritance, or non-inheritance, of various diseases and defects which occur in their families.

Because of this increased knowledge of the role of heredity and the increased demand for genetic counseling, the Dight Institute of Human Genetics and the Minnesota Human Genetics League proposed for enactment by the 1959 Minnesota State Legislature a bill providing for the establishment of a human genetics unit within the Minnesota State Board of Health. The purpose of the bill was to provide counseling and educational services on a statewide basis. This bill provides for developing and carrying out a program in human genetics which includes "the collection and interpretation of data relating to human hereditary diseases and pathological conditions; the assembly, preparation, and dissemination of informational material on the subject for professional counselors and the lay public; the conduct of such research studies as may stimulate reduction in the frequency of manifestation of various deleterious genes, and the provision of counseling services to the public on problems of human genetics. It shall consult and cooperate with the University of Minnesota, the Public Health Service, and the Children's Bureau of the Department of Health, Education and Welfare, and with nationally recognized scientific and professional organizations engaged in studying the problems of human genetics."

The same bill also provides for an advisory committee of nine members for appointments of 6-year terms to assist and advise the State Board of Health in

formulating policy and programs for the study of problems of human genetics. This advisory committee consists of members from the Dight Institute for Human Genetics, the University's Department of Pediatrics, Dental School, and Department of Anthropology, local physicians from the Twin City area and the Mayo Clinic, and from several of the foundations in this area.

It was decided that the two main functions of the unit in its early years of development would be to provide genetic counseling and informative and educational material to various professional groups who would be directly involved in human genetic problems. These would include physicians, social workers, nurses, and educational institutions.

Because of the problems involved in providing genetic consultation, it was decided that this service would be provided only directly to or by referral from the following individuals:

1. All licensed physicians and dentists
2. Private hospitals, institutions, and agencies
3. Official state and local institutions (welfare departments, adoption agencies and agencies that deal with the physically and/or mentally handicapped)
4. Individuals—by referral from their local physician or dentist, with only general information being provided without professional referral.

Because of the need for an accurate medical diagnosis before genetic counseling can be given, it was decided that lay requests for counseling would have to be refused.

The procedure for consultation is as follows. Inquiries about genetic information and consultation may be made by telephone or letter. Because of the need for not only an accurate medical history but an accurate family history in evaluation of hereditary aspects of a trait, it is preferable that some member of the family be interviewed by the Human Genetics Unit. However, if this is not convenient or feasible the request for genetic evaluation will be given upon receipt of as much information on medical and family history as the physician or agency finds available. The referral from physician, dentist, or agency should include the patient's name, address, local identification, reason for the referral, as complete a history and diagnosis as possible, and such information as might be pertinent to the patient's understanding of the problem. Whatever follow-up procedure is deemed advisable is carried out. This would include checking records from other state departments, the hospitals, private or public, within the state, and from other sources which the physician may indicate. A full account of the interview and the findings are then sent directly to the referring source. This information is discussed with the family at the time of the interview only upon permission of the referring physician.

When a family has been seen or consultation has been given, records are kept of all pertinent information received. When possible, a pedigree is taken and checked with whatever available records there may be, and a written report is included in this record of all comments and conversation during the interview. Also, all copies of information sent or received on a particular proband are kept on file. All such information is considered confidential and is not released without written consent. This information, however, is available for research purposes under a confidential law protecting such studies, if deemed advisable by the state board of health.

The Minnesota Human Genetics Unit in its first year of existence has seen cases not only of medical interest but also has done a great deal of counseling with adoptive agencies concerning placement of children with mixed racial ancestry.

The educational part of the program has included lectures to various lay associations who have a vested interest in hereditary problems such as local chapters of the Association for Retarded Children, Crippled Children's groups, Association for the Blind, and similar organizations. There have also been medical staff lectures and discussions in several Minneapolis-St. Paul hospitals and the response has been extremely gratifying. Also, several schools of nursing in the Twin City area have requested lectures for their student nurses and these have been provided.

A series of five lectures which will cover the areas of metabolic diseases, chromosome work, human serum proteins, and radiation effects has been prepared on problems in human genetics which is aimed at physicians and other related professional people. These lectures will be given once monthly and will be presented by various lecturers from throughout the United States. It is hoped that this will become an annual series and that in future years specific topics will be taken up in greater detail.

A supplement to the Minnesota birth certificate has now been worked out. It will provide for an automatic reporting of blood group reactions in newborns and the presence of congenital malformations and other possible hereditary or birth problems. This will be similar to the fetal death record supplement which has been in use in Minnesota for the past four years. It is hoped by this method that a routine reporting of any of the congenital malformations and other possible hereditary diseases will give this unit a source of information not only for counseling purposes but also for research purposes in the future.

A registry of familial and hereditary diseases is now in being and includes all or almost all phenylketonuria patients within the state and all Huntington chorea patients. This registry is to be limited in scope in order that the file and records may be kept up to date and thus provide a current and accurate registry of these diseases throughout the state of Minnesota rather than a dead accumulation of dated material.

A study of human transferrins has recently been conducted in cooperation with the Rockefeller Institute on the Chippewa Indians at the Redlake Indian Reservation. It is hoped that the results of this study will be available in the near future. The state law establishing the Human Genetics Unit provides for such research projects, and it is hoped that similar projects will be initiated and carried out in the future.

While this is a new and unique service within the United States, that is, the provision for genetic counseling and education through a state agency, it is felt that the first year of operation has indicated that such a service is not only desired, but is needed and useful within the state. Several states have indicated an interest in establishing similar programs, and we feel that this can be done with profit to these states.

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Book Reviews

METROPOLIS AND REGION: Otis Dudley Duncan, W. Richard Scott, Stanley Lieberson, Beverly Duncan, and Hal H. Winsborough. Johns Hopkins Press, Baltimore, 1960, pp. xviii + 587, $8.50.

Three purposes are set forth by the authors of this book. These are (1) to demonstrate the use of available information and techniques in the characterization of the metropolis and the metropolitan economy, (2) to outline the present structural characteristics of the U. S. metropolitan economy, and (3) to survey the ". . . industrial composition and regional relationships of the larger cities . . ." as a basis for further research. Theoretical literature dealing with the metropolis and the metropolitan economy is reviewed and illustrative demonstrations of relationships found among measures of urbanization, community size, and economic functions are set forth. Following the treatment of metropolitan and nonmetropolitan economic activities, a systematic approach to the identification of salient features of individual metropolitan areas, as components of the national economy, is presented, and industry "profiles" are subsequently developed for 51 metropolitan areas.

While its companion volume, *Regions, Resources, and Economic Growth* by Harvey S. Perloff, *et al.*, deals with matters of growth and trend, this presentation is concerned with midcentury America in cross-section.

The authors characterize their approach as "ecological" and refer the reader to Amos Hawley's *Human Ecology* (1950) for the theoretical departure. Two concerns of ecological theory are emphasized: the development of population agglomerations, as conceived of by several location theorists, and the functional dynamics of the social and economic organization of these agglomerations.

In the first section of the book, of which there are four, alternative approaches to understanding the genesis and development of towns and cities are discussed in an elucidation of a theory of functional hierarchy in which activities in metropolitan areas, inter-metropolitan relationships and nonmetropolitan activities are understood, primarily in terms of the larger national economy.

Although several approaches are available to the investigator concerned with the hierarchy of cities, the authors have concentrated upon the "correlates of size" approach that arises in the general agreement among scholars that the urban hierarchy is somehow related to the population size of communities. Their aims in the matter of hierarchy are to provide demonstrations of the validity of the correlation of community size with hierarchical position and to identify points of variation and departure from this relationship among relevant variables when correlated with size. Statistical analyses of the effect of community size upon industry patterns and of the urbanization of industry groups are presented in illustration and elaboration of the "correlates of size" approach.

Reviewing various criteria of metropolitanism and schemes for delimiting metropolitan community areas, the authors explain their approach as one which emphasizes the interdependence among cities and their hinterlands rather

than the type of settlement pattern. Based on this conceptualization of the metropolitan community, major economic functions of metropolitan areas are treated in a manner which illustrates further the ranking of communities and the apparent influence of the larger communities among their smaller neighbors. Bank loan volumes among communities are analyzed and the interflow of funds among 36 Federal Reserve Board "zones" is examined in terms of gravity models which account for flow by size-measures of the areas of origin and destination and the distance between them.

The second major section of the book deals with hinterland or nonmetropolitan activities. The authors rely upon a systematic sample of 100 nonmetropolitan State economic areas for the analysis of the effect of (1) "population potential" (after J. Q. Stewart and C. H. Harris), (2) distance to nearest standard metropolitan statistical area, and (3) "local urbanization" (a summary measure of the size-of-place distribution of the population in the nonmetropolitan State economic area) upon the activities carried on in these areas. Multiple correlation and regression techniques are used to distribute the variances, in activities such as manufacturing, manufacturing broken into processing as opposed to fabricating, and the extractive functions of coal mining and agriculture, over the three independent variables.

The last two sections of the book deal with the analysis of the industry structure of standard metropolitan statistical areas (SMSA's) in terms of the relationship between that structure and the regional situation of the SMSA. Industry groups as reported by the Bureau of the Census are rearranged in attempts to classify production industries by stage in the productive process and by character of output-consumer, and to classify service and distributive activities into local and nonlocal groups. Eleven functional industry categories are thus constructed and indices of dissimilarity are computed which summarize the differences in the distributions of the labor force between each SMSA of 100,000 or more and the United States.

The methodology of a case-by-case study of 51 SMSA's of 300,000 to 3,000,000 population is set forth in which the authors attempt to (1) establish which industries make up the "industry profile" of the SMSA's, (2) identify the major inputs and outputs of the profile industries and, respectively, their origins and destinations; and (3) to characterize the regional relationship of the SMSA in terms of supply and market or service areas of its profile industries. The "industry profiles" which are constructed are, essentially, descriptive of the specialized industrial functions in each SMSA, specialized in the sense of employing a disproportionally large number of persons. In conclusion, the authors undertake a review of their 51 case studies in considering the variety of regional relationships and an approach to the classification of communities. An enumeration of city-region relationships, with examples, is provided and a classification of communities is set forth ". . . which aims to embody criteria of metropolitanism and salient aspects of center-region relationships, as well as some of the ideas about hierarchy . . ." (p. 259).

The process of allocating the SMSA's to seven functional categories is described and the last section of the book (272 pages) supplies the highlights of the case studies, should the reader care to look into the matter further.

Metropolis and Region should be of considerable value to students of human

ecology and economic geography, as well as to workers in a variety of related applied fields concerned with industrial location, area redevelopment, and the administration of public and private programs on a national level. It is not easy to read, for it deals with a difficult subject in a sophisticated manner. The theoretical treatment is very good and well written. The analytical presentations may be characterized as insightful and ingenious; and, while not particularly well tied together, they contain a considerable wealth of information concerning the economic functions and interrelationships of both metropolitan and nonmetropolitan areas. An extensive bibliography and an index are included.

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SCIENCE AND LIBERAL EDUCATION: Bentley Glass. Louisiana State University Press, Baton Rouge, 1959, 115 pp. (with foreword and preface of 10 pages), $3.00.

In the vast river of published material that flows unceasingly, there occasionally appears a volume that repays reading several times and that one can, with both profit and enjoyment, carry with him on his travels. Such a book is this small and unpretentious work of Johns Hopkins University's distinguished geneticist. In three essays based on the Davis Washington Mitchell Lectures given at Tulane University in 1958, Dr. Glass examines the impact of science upon the scope of liberal education and the social and ethical readjustments made necessary by advances in biological knowledge.

Running through the three essays is the concern with the relation between man's increasing ability to control the forces of nature and his progress in achieving wisdom and the understanding of the values of the objectives to which nature's forces may be directed.

The first essay, "Genetics in the Service of Man," reviews in simple but lucid terms the history of genetics as a science and the nature of present genetic concepts. Here the traditional debate concerning the relative importance of heredity and environment vanishes in the realization that the individual is the indivisible product of both. From a review of the geneticist's service to man in his nutritive and economic problems, the author turns to the more thorny dilemma of applying genetic knowledge to the betterment of man himself as a biological entity. In a sober examination of the ways by which genetic improvement of mankind may be achieved, the author does not overlook the biological perils that may be inherent in them. There emerges the suggestion that the creation of an environment in which the processes of natural selection would favor certain chosen genetic complexes may, in the long run, prove to be the most fruitful approach to the genetic improvement of man.

In the second essay, "Liberal Education in a Scientific Age," the theme is continued that the distinguishing characteristic of man is his ability to transmit to the following generation not only his biological inheritance by way of the germ cells, but in addition a cultural heritage through education and the means of communication.

Science does not stand alone but bears also upon modern man's concepts of beauty and meaning. In this increasingly intimate interrelationship, the curriculum and the manner in which education and research are advanced become of in-

creasing importance. Of the effort to achieve understanding of the universe and of man himself, Dr. Glass says:

"For this, science has its limitations as well as powers. It tells us much, but hardly everything. It can deal with matter and energy, space and form and time. It scarcely measures values; it is thwarted by intangibles. Science reveals truths, but perhaps never the whole of truth. Its grandest conceptual schemes and theories may fail and have to be replaced. It is objective, not subjective, and the inner life of man is, and must always remain, subjective. Science is the product of the human mind, but what the mind is we do not know."

The third essay, "Darwinian Evolution and Human Values," explores the theological and philosophical impact of the concept of evolution identified with the name of Charles Darwin although foreshadowed a century earlier by Maupertuis. The idea of the animal nature of man and his being but a part of the general stream of life occasioned violent debate in the latter part of the 19th century, a debate that occasionally is found to continue even to this day. Those who based their philosophies upon the assumption of the unique creation of man could not with equanimity accept the implications of the biological continuity of evolution.

Finally, there emerges more fully the concept of modern man as the product of both biological and ethical evolution together with a corresponding broadening of the understanding of selective forces. Human control over man's own evolution implies the substitution for natural selection of chosen goals or ideals. The adequacy of our ethics to guide these choices will become an increasingly crucial question.

In this book the reader finds a penetrating analysis of the most significant scientific problem of our age. Science here is no cold and impersonal pursuit but a warm and vibrant effort of the mind to understand the meaning of human experience.

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CAN MAN BE MODIFIED: Jean Rostand, Basic Books, New York, 1959, 105 pp. (Translated from the French by Jonathan Griffin). $3.00.

HUMAN HEREDITY: Jean Rostand, Philosophical Library, New York, 1961, 139 pp. (Translated from the French by Wade Baskin). $4.75.

These two books deal with matters of interest to members of the Eugenics Society: the biological modification of man through chemical and surgical intervention during development, and the mechanisms by which characters are transmitted from generation to generation. They are written in conversational style and have been translated into readable English which appears to retain the author's personality. These virtues are offset, however, by serious defects.

Can Man be Modified? starts with an account of modern experimental embryology, transfer of nuclei between fertilized ova, sex reversal, and similar techniques which have been employed primarily with amphibian eggs. The social consequences and moral issues arising from application of these operations to man are then considered. Some of the examples are rather sensational and the non-biologist might have difficulty in distinguishing between immediate prospects and flights of fancy. Of course, it is dangerous in science to set limits on achievement and to state categorically

that any prediction is fanciful. Readers should know, however, that mammalian embryologists must deal with smaller ova with more stringent requirements which have not been cultured beyond very early stages. Mortality of ova and of donors is high in mammalian experimental embryology, a fact of no great consequence when dealing with mice or rabbits but not to be taken lightly when human beings are concerned. Bisexual reproduction followed by intrauterine growth has been reasonably successful in man, and other methods are unlikely to compete successfully in the foreseeable future.

Some of the other issues discussed such as psychosurgery, artificial insemination and eugenics have more urgency, but receive less attention than the possibilities of producing supermen by stimulating in cultured human embroys an extra division of the cerebral cells, thus doubling the number of pyramidal neurones.

Human Heredity is written in a more subdued style, and would be a good book if it were cleared of its inaccuracies and brought up to date. The number of human chromosomes is still stated in a 1961 publication as 48; recent findings in the cytogenetics of mongoloids and various intersexes are not mentioned. In a list of dominant and recessive characters, well-established mendelian characters such as brachydactylism and agglutinogens A and B are grouped with complexly inherited traits such as eye and hair color, and such vague entities as susceptibility to tuberculosis.

The chapters on race, inheritance of acquired characters, and eugenics suffer less from obsolescence and provide the general reader with an understanding of these topics. At $4.75 the book is overpriced, and there are more accurate and more lucid texts, such as Penrose's *Outline of Human Genetics* at about one-half the cost.

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PROSPECT FOR AMERICA: The Rockefeller Panel Reports. Doubleday and Co., Inc., Garden City, New York; 1961, 486 pp., $1.45.

In 1956 the Rockefeller Brothers Fund created a Special Studies Project with three major objectives:

"1. To define the major problems and opportunities that will challenge the United States over the next 10 to 15 years;

2. To clarify the national purposes and objectives that must inspire and direct the meeting of such great challenges; and

3. To develop a framework of concepts and principles on which national policies and decisions can be soundly based."

To achieve these frighteningly broad goals, distinguished individuals from business, government, labor, education and religion were brought together in special committees, under the general direction of an overall panel of thirty. The present book is a compendium of six separate and previously published reports covering United States foreign policy, military security, foreign economic policy, American economic and social problems, education, and democracy. While a competent appraisal of the book would demand almost as many reviewers as topics covered, a few general remarks will be made, followed by comments of specific concern to readers of this journal.

Despite varied authorship, consistently lucid organization and writing style are characteristic of the volume. Complex

topics are discussed in clear and relatively non-technical prose, so that any well educated person can grasp the basic problems, concepts, and suggested solutions in a variety of fields. Highlighting scores of social, economic and poltical problems, and suggesting a multitude of solutions, the volume provides an ideal springboard for serious discussion in university, government and business groups.

As might be expected, scope and simplicity are achieved at a certain price, and often goals and solutions are reduced to almost banal listings. In analyzing economic development in modernizing countries, the treatment of the role of government structure is virtually limited to the following sentence: "Essential elements to the rate of advance, therefore, will be law and order with justice; the development of sound structures for taxes, customs, and budgets; plus an efficient, loyal and trained civil service." The problem of racial prejudice in our society occupies one paragraph which concludes that "it is a matter that must be attacked by the imaginative use of every means at our disposal." Juvenile delinquency is quickly diagnosed as a problem with social causation (". . . a result of a generally more complex, impersonal, and crowded society."), and just as quickly prescribed a psychological antidote ("intensive casework of a highly individualized nature.")

For a book which is long on inventories of problems and solutions, there is a surprising lack of attention to demographic solutions to demographic problems. While population increase is viewed with mild alarm, it is seen largely as a *challenge* for speeding up economic development and educational facilities in underdeveloped areas. (As for the United States, population growth is listed along with "our extraordinary record of rising productivity" and "the inherent dynamism in our free enterprise economy" as a major reason for facing the future with optimism.) Public health is first held responsible for population increase, and then highlighted as requiring further development, with no mention of the necessity for accompanying programs of fertility control or migration. In a specific discussion of Latin America as "A Test Case," the authors cite the area as having the highest population growth in the world, then again proceed to play up the need for the expansion of public health facilities in order to further eliminate disease, with no discussion of the commensurate need for programs of population control. If this were a government report or a report authored primarily by politicians, one could understand the omission. But that such an influential private report by distinguished Americans should appear to regard population change so completely as an independent variable, influencing policy but not subject to influence by it, seems not only inexcusable but tragic.

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Social Policies and Population Growth in Mauritius: Richard M. Titmuss and Brian Abel-Smith. Methuen and Co., Ltd., London, 1961, 308 pp., 15s net ($2.15).

The Economic and Social Structure of Mauritius: J. E. Meade and others. Methuen and Co., Ltd., London, 1961, 246 pp., 15s net ($2.15).

Mauritius, 720 square miles of island 500 miles east of Madagascar, was settled in the early eighteenth century by the French and by slaves brought in from Africa to till the sugar plantations. The

English, after taking over the island in the Napoleonic wars, later freed the slaves. But when they found the freedmen reluctant thereafter to work on the sugar estates, they imported indentured laborers from India. That influx quickly expanded the population from 183,000 in 1851 to 313,000 in 1861. From then until recently the island's population grew slowly, but a surge of growth after 1940 raised it to 600,000 by 1957. Present growth trends make it probable that Mauritius's population will reach 950,000 by 1972; assuming mortality rates decline to "levels comparable with those in medically advanced communities," it may number as many as 3,000,000 by the end of the century.

To recommend plans for economic development at least as rapid as the population growth and for a welfare and social insurance program to ameliorate the poverty and unemployment in the island, the Governor appointed two commissions in 1959. Their reports make up the two volumes reviewed here. Their near simultaneous publication reinforces the value of each because they are related not only in their bearing on the same geographical area but also in the interdependence of their subject matter.

Separately and together, the books make important contributions to the literature of economically underdeveloped areas. They are excellent case studies, not general treatises, concentrating entirely on the business at hand, which is Mauritius. Economists, sociologists, and public administrators with interest in underdeveloped, nonindustrial areas of the world will all find rich material in the reports. Necessarily, generalization to other undeveloped areas and their populations must be cautious.

Population growth is a major, though not a central, concern of both books. Both view it as a threat to the island's welfare. Meade is concerned with it as a measure of the pace economic development must keep to maintain even current living standards. Titmuss is concerned to insure that the social welfare program will slow, rather than speed, population growth. Sharing the concern of the authors with population growth is a negative attitude of the Mauritians toward manual labor, which has historical roots richly nurtured in recent years by the type of education afforded. Large numbers of the population feel "overqualified," often without objective basis, for the jobs available and refuse to accept manual labor. The result is widespread unemployment and idleness at the same time that there is a shortage of labor. The problem is aggravated by, if not inherent in, conditions of overpopulated countries where the skills required in the labor force neither provide for security nor allow for the upward mobility for which the educational program creates a demand. The only chance of either security or upward mobility is the white collar job of the bureaucrat, for which manual labor is no preparatory experience. Neither book makes entirely adequate recommendations to circumvent the problem.

Meade's attack on it is to recommend measures which will assure that employment opportunities expand with the increasing population of working age. This will not be an easy task, unless population growth is controlled, for Mauritius is not heavily endowed with either resources or a readily accessible market to raise sanguine hopes for a prosperous industry. Meade nevertheless lists many opportunities for the establishment and expansion of labor intensive activities which promise improvements in the level of living. Ex-

pansion of the sugar industry is not recommended.

Titmuss's report, on the other hand, is concerned with the establishment of welfare measures, social insurance and pension schemes which will not in their administration encourage abuses. The recommended program is broad. The author takes the view "that the emphasis in public policy should be on the prevention of sickness and unemployment, rather than on alleviation through social welfare provisions." Moreover, he adopts the attitude, partly to simplify administration, that "assistance is a right" of every citizen, irrespective of means. The price is high, and largely unspecified. Despite the breadth of the program envisioned, Titmuss does attempt to "build in" correctives to both malingering and unlimited population growth. He proposes "aid to those who are genuinely unemployed without extending it to those who are unwilling to work or to those who are working for at least some part of a week." He also opposes welfare schemes which offer incentives for the procreation of large families. Instead, he urges popularizing the three-child family by: (*a*) encouraging later marriage, (*b*) raising the status of women, (*c*) giving incentives to wider spacing of births, (*d*) providing for safer motherhood, and (*e*) discouraging more than three births for any woman.

Thus an intellectual heir of Godwin makes common cause with the intellectual heirs of Malthus. An example of Titmuss's approach is the fascinating proposal to reward fertility limitation by granting a supplementary pension (Small Family Pension Benefit) to all women still married at age 65 who had not in any marriage contracted prior to age 45 borne three live-born children, on grounds that her limited role as mother would not give her more than two children to help support her and, implicitly, that by limiting her fertility she has contributed to the general welfare. The efficacy of such a plan in controlling fertility remains to be seen, but I found the restriction that the woman be still married at age 65 and that her husband also have attained the age of 65 difficult to understand. Nor do I see why the policy should not be instituted immediately, even though benefits under the plan are not payable until women now in their childbearing period reach age 65. An advantage in starting such benefits even earlier would be the demonstration of the economic value of limited fertility to those now bearing children.

The payment of a marriage benefit to the father on the marriage of a daughter sounds more far-fetched, even though designed to curb population growth by making the payment dependent upon the daughter's being 21, childless, and not previously married. At another point Titmuss concludes: "It is clearly wrong for one income group to be given an incentive to have larger families when such an incentive is thought unjustified for other income groups." Not everyone will agree on the clarity of this principle They will come closer to agreeing with Titmuss's general argument that taxation and credit allowances in Mauritius, like the sugar industry itself, have unduly favored the wealthy few.

Whether Meade's and Titmuss's recommendations for economic development and social security will make a greater contribution to the saving of life than to the prevention of reproduction is problematic. The welfare provisions may assist in reducing fertility, but the

major impetus to effective reduction in fertility must come from other sources.

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CLASSIFICATION OF KIN, AGE STRUCTURE AND MARRIAGE AMONGST THE GROOTE EYLANDT ABORIGINES: Frederick G. G. Rose. Pergamon Press, Oxford and New York, 1960, 572 pp., £5.

This book describes the results of an anthropological field study of a group of aborigines living on an island in the Gulf of Carpentaria, Northern Australia. The study is novel in a number of respects, but principally because it is the first (and probably the last) attempt to assess the age structure of an aboriginal Australian society in quantitative terms.

The actual field work was done between May and September, 1941, before the aborigines of Groote Eylandt were intensively exposed to the missionary and other influences which have since drastically altered their way of life. Inasmuch as all of the aboriginal cultures of Australia have by now been greatly changed, if not completely destroyed, it is very unlikely that we shall ever have data for other Australian societies comparable to the data Rose collected for Groote Eylandt.

Rose originally framed his study as a traditional investigation of kinship and marriage. But he soon came to realize that the traditional method of investigation, i.e., the "genealogical method," was not completely adequate to the task of obtaining an accurate description of how people on Groote Eylandt classified kin; the genealogical material obtained from one informant would often conflict with the genealogical material obtained from another informant. The same type of relative (viewed objectively) might be termed "father" by one, "elder brother" by another. In order to investigate the reasons for such discrepancies, Rose adopted two novel procedures. First, he tried to photograph all the members of the Groote Eylandt population so that he could ask each to identify, by means of the photographs, how he or she was related to everyone else. Rose could only do this, however, with 219 of the total 300-350 aborigines, and not even completely with many of those. Of the some 47,000 possible identifications which the 219 respondents could have made, only about 25,000 were actually elicited—mostly because Rose did not have photographs of all the 219 when he started out to collect the relationship data. The second novel procedure which Rose adopted was to estimate the age of each of his 219 respondents, later adjusting his estimates on the basis of classificatory kinship data, i.e., who called whom younger (or older) brother (or sister). Since he himself made these adjustments, and since he had no objective way of verifying the accuracy of his final estimates, the results of the study can only be considered suggestive, as Rose himself realizes. Still, when combined with the data collected by means of the identification procedure described above, the age estimates strongly suggest that what a given respondent calls a particular kinsman (or kinswoman) depends upon whether they are related through a primary or through a subsequent marriage.

Indeed, the most important results of the study have to do with marriage, its form, its stability, and the implications thereof. Groote Eylandt in 1941 was a highly polygynous society. At least 70 per cent of the women were married to a man who had at least one other wife. (Marriage occurred when a girl went to live with a man in his camp.) The usual age at which a girl married was nine or ten. But men did not usually take a wife

until they were 30. Of a sample of 82 men (16 years of age and over), 33 had no wives (27 of these were 30 or younger), 25 had one wife, and 24 had two to six wives (most frequently only two). The 41-50 age group of men had the most wives, averaging 2.9 as compared with 1.8 for the 31-40 and 51-60 age groups.

Marriage was highly unstable on Groote Eylandt, particularly when it involved an older man. Some instability of marriage is inevitable in a nomadic, hunting and gathering society with a high mortality rate. But on Groote Eylandt a more important determinant was a custom referred to in the anthropological literature as "wife-stealing." Girls were seemingly spirited away from their camps, either before or after going to live with the men to whom they had been promised (sometimes before birth), and older women often eloped with men who were younger than their husbands. Of a sample of 62 women, only five had been wife to just one husband, and 29 had been wife to three or more husbands.

A typical marital sequence seems to have been the following (p. 79): "A man may first acquire a wife to live with when he is in his early thirties by stealing her from an older man. This woman may be older than himself. Somewhat later he may acquire another wife, this time a young girl who had been promised him through the operation of the kinship system. By the time he is 45 or 50 he may have obtained a third wife, possibly through inheritance from a deceased clan relative. By the time he is 60 his first wife will probably be dead and possibly one of his other wives will have been stolen from him or eloped with a younger man. His third wife will probably continue to live with him until he dies. On his death this wife, if she is still economically useful, will be taken as wife by a man of her husband's clan. . . . If she is 'close up dead' she will join one of her son's family groups as an appendage and depend on his charity and that of his wives for maintenance."

Rose suggests that a sort of natural selection produced the system of polygyny. If the females in a particular group were more equitably distributed among the males, the women would not have co-wives to help them in their necessary tasks (it is the women who collect most of the food consumed by the camp group) and they would therefore not be as able to nurture and rear the many offspring which would be needed to replace the early-dying parental generation (the infant mortality rate was also very high). Given no change in the ecological circumstances, such a group would tend to die out, to be replaced by a group in which a greater development of polygyny "existed for the protection of the mothers and offspring" (p. 175).

A final selective advantage can be suggested for the instability of the polygyny, namely, that a system of circulating spouses would maximize the reproductive rate. As Rose notes, only one woman on the island was considered barren.

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MEETINGS AND RECENT PUBLICATIONS

GROWTH IN LIVING SYSTEMS (Edited by M. X. Zarrow *et al.*): Basic Books, Inc., New York, 1961, 759 pp., $15.00.

Proceedings of an international symposium on molecular biology held at Purdue University in 1960 in which more than thirty biologists participated. F. H. C. Crick and M. B. Hoagland discuss the relationship between the nucleic acids and the proteins, a basic theme of the symposium. The material is divided into three parts: I. Molecules, Viruses, and Bacteria; II. Cells, Tissues, and Organisms; III. Plant Growth and Plant Communities.

CAUSES OF MENTAL DISORDER—A Review of Epidemiological Knowledge, 1959: Milbank Memorial Fund, New York, 1961, 383 pp., $3.50 (paper).

Eight authorities take stock of our present state of knowledge about causes of mental disorders. These proceedins of a round table held in 1959 under the sponsorship of the Milbank Memorial Fund form the eighth of the Fund's publications in the field of mental health.

The volume begins very logically with a discussion of genetic factors by the Scandinavian geneticist Dr. Jan A. Böök. He examines the evidence for genetic factors in inborn errors of metabolism and schizophrenia and manic-depression. Proof of genetic etiology is impossible without a method that identifies an almost one-to-one relationship with the causative gene mutation. Repetition of traditional family and population surveys will never enable the geneticist to prove his case definitely, concludes Dr. Böök. He does not find a genetic approach to the neuroses meaningful at the present time.

Other papers deal with damage to the fetus and the brain, the family, social structures and changes, and cultures as causative of mental disorders.

DEMOGRAPHIC INFORMATION ON TROPICAL AFRICA: Frank Lorimer. Boston University Press, Boston, 1961, 207 pp., $2.50 (paper). POPULATION IN AFRICA (Edited by Frank Lorimer and Mark Karp): Boston University Press, Boston, 1961, 88 pp., $1.00 (paper).

These publications of the African Studies Program at Boston University in cooperation with the Population Council are of special concern because of the increasing impact of the African nations on the world scene. Frank Lorimer headed up an investigation of sources of demographic information in tropical Africa, visiting many of the statistical offices and research centers. "Demographic Information in Tropical Africa" reviews the present status of demographic information. Dr. Lorimer found that demographic statistics in Africa have undergone a significant transformation during the postwar period and that useful statistical information now exists for most of these countries. New methods, international cooperation, and other advances have pushed along the field of demographic statistics in Africa.

Dr. Lorimer also acted as an organizer of several meetings on African population problems. "Population in Africa" is the report of one such meeting. This population discussion was held at Boston University in cooperation with the Pop-

ulation Council, and Dudley Kirk, Demographic Director of the Council, acted as chairman.

DAL CENSIMENTO DELL'UNITA AL CENSIMENTI DEL CENTENARIO—Un Secolo di Vita della Statistica italiano, 1861-1961. Istituto Centrale di Statistica, Rome, 1961, 205 pp. (paper).

A survey of a century of progress in Italian census statistics, from 1861 to 1961, put out by the Central Institute of Statistics in Rome, founded in 1926. This demographic survey is also a history of the first century of an Italy reunited in a single national state. In 1861 the density of population in Italy was 87 per kilometer; now it is 170. The census is traced from Count Cavour, the organizer of official Italian statistics, through the postwar development of the Central Institute of Statistics. Illustrations commencing with the census in Judea under Caesar Augustus and ending with the electric computer of today add to the attractiveness of this very readable little history.

PHENYLKETONURIA: Willard R. Centerwall and Siegrid A. Centerwall, U.S. Department of Health, Education, and Welfare, Children's Bureau, 1961, 28 pp., 15¢ (paper).

A nontechnical pamphlet from the Children's Bureau for physicians and public health workers which describes the recent revolutionary strides in the treatment of the inborn error of metabolism resulting in the disease, phenylketonuria. The genetics of this disease is explained and its clincal course. Testing methods for detection are given. Diets which have been successful in preventing or favorably modifying the mental retardation stemming from the disease are listed.

RELATIVISM AND THE STUDY OF MAN (Edited by Helmut Schoeck and James W. Wiggins): D. Van Nostrand Company, Inc., Princeton and New York, 1961, 259 pp., $6.50.

A symposium on problems of relativism as related to disciplines studying man. The papers by Conway Zirkle on Human Evolution and Relativism and by Leonard Carmichael on Scientific Psychology of Human Nature are relevant to eugenics.

TOWARD A SCIENCE OF MANKIND: Laura Thompson. McGraw-Hill Book Company, New York, 1961, 276 pp., $5.95.

A "science of mankind' 'is not only possible but imminent, according to the author of this book. An anthropologist from the University of North Carolina, she declares that mountains of facts are piling up but attempts to translate them into general principles are lagging. Her hypothesis described here is based on empirical field research and clinical testings in a number of culturally diverse communities.

OTHER PUBLICATIONS RECEIVED

Multilingual Demographic Dictionary: Hannes Hyrenius. Statistical Institute, University of Gothenburg, Sweden, 1961, 136 pp. (paper). A demographic dictionary authorized by the International Union for the Scientific Study of Population. Editions available in English, French, German, and Swedish.

Publications and Dissertations from the Department of Medical Genetics, New York State Psychiatric Institute (1938-1961): 1961, 20 pp. (mimeographed). An impressive listing of 187 publications and 8 Ph.D. dissertations coming from the pioneering Department of Medical Genetics at the New York State Psychiatric Institute, under the leadership of Dr. Franz J. Kallmann.

The American High School and the Talented Student: Frank O. Copley. University of Michigan Press, Ann Arbor, 1961, 92 pp.,

$3.95. An educator from the University of Michigan recommends advanced placement programs in high schools for the academically gifted and suggests how to set them up.

The Scientific American: September 1961. A special issue on "The Living Cell."

Daedalus: Journal of the American Academy of Arts and Sciences, Fall 1961. A special issue on "Excellence and Leadership in a Democracy."

A Report on the Epilepsy Problem: George N. Wright. An 8-page review of the newest scientific developments in epilepsy. Available free from the National Epilepsy League, 208 North Wells Street. Chicago 6, Ill.

MEETINGS

Leaders in biophysics will gather in the Sheraton-Park Hotel, Washington, D.C., for the 6th annual meeting of The Biophysical Society, February 14-16, 1962. More than 600 scientists, including representatives from several foreign countries, are expected to attend. There will be about 200 technical papers presented. In addition, three symposia are scheduled.

Dr. Francis Crick, of Cambridge University, England, associated with the American scientist James Watson in the development of the Watson-Crick model of the DNA molecule, will chair a Symposium on Biological Replication.

Other speakers will be: Dr. Daniel Mazia, University of California (mitotic apparatus); Dr. H. Vasken Aposhian, Stanford University (DNA replication); Dr. Howard C. Taylor, Columbia University (chromosome reproduction); and Dr. Norton D. Zinder, Rockefeller Institute (RNA bacteriophage).

HELEN G. HAMMONS

ANNALS OF HUMAN GENETICS

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Frequency of colour blindness in Andhra Pradesh school children. K. R. Dronamraju and P. Meerakhan

Mongoloid twins with 48 chromosomes (AA + AnXXY). T. W. J. Hustinx, P. Eberle, S. J. Geerts, J. ten Brink, and L. M. Woltring

A factorial analysis of sex-ratio data. A. W. F. Edwards

Rare genetic conditions among the Caingang Indians. F. M. Salzano

Stillbirths and infant mortality in Twins. A. Barr and A. C. Stevenson

Hand clasping in Spaniards. J. Pons

A male with XXYY chromosomes. J. R. Ellis, O. J. Miller, L. S. Penrose and G. E. B. Scott

Chromosomal mosaicism in a case of Klinefelter's syndrome associated with thalassaemia. M.d'A Crawfurd

Enlarged satellites and multiple malformations in the same pedigree. J. R. Ellis and L. S. Penrose

Fibrocystic disease of the pancreas: A comment. M. G. Bulmer

REVIEWS.

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Periodical Reviews

GENETICS

CHROMOSOME STUDIES

Publications on cytogenetic investigations once again form a large part of the reports appearing currently in foreign journals. For articles in the weekly publications the *British Medical Journal* and *Lancet* only the publication dates are given. The interested reader may easily locate pertinent references in this manner.

MacLean, Harnden, and Court Brown (*Lancet*, 8/19) examined the sex chromosome constitution of 3000 male and 3000 female live-born infants in several hospitals in Edinburgh. Nine chromatin positive infants were discovered in the male group (subsequently three were shown to be XXY, four XY/XXY mosaics, two were not examined for karyotype) while only one chromatin negative infant (XO) was found among the females. This incidence of abnormalities in sex chromosome constitution is in general agreement with previous reports. The authors observed four cases with *two* Barr bodies among the chromatin positive females. In one of them blood and skin cultures failed, the other three were reported to be XXX. In a survey of 88 mental defectives in southern Sweden (48 males and 40 females) Gustavson and Akesson (*Lancet*, 9/23) failed to find a case of abnormal sex chromatin.

Harnden (*Lancet*, 8/26) suggested a mathematical equation for the evaluation of nuclear sex in triploid XXY human cells, while Mittwoch and Delhanty (*Lancet*, 9/2) gave details on the nuclear sex of a triploid fetus previously reported by Delhanty.

The properties of X chromosomes were discussed by Lyon (*Lancet*, 8/19) and by Ohno (*Lancet*, 9/23). Leon, Epps, Becak & Becak (*Lancet*, 10/14) pointed out discrepancies between bone marrow and peripheral blood chromosomal constiution. Other reports included the description of triple mosaicism (XO/XX/XXX) in one case with Turner's syndrome and one with Hirschsprung's disease (Hayward and Cameron, *Lancet*, 9/16); mosaicism in a case of Klinefelter's syndrome associated with thalassemia (Crawfurd, *Ann. Hum. Genet., Lond.* 25: 153-158); male pseudohermaphroditism with female sex chromatin pattern in several tissues and normal female karyotype from skin culture (Shah, Naik, Mahajan, Dave & Paymaster, *Brit. Med. J.*, 8/19); the possible significance of chromosomal abnormalities in a four-year-old child with convulsive disorder and organic brain changes (Dobson and Ohnuki, *Lancet*, 9/16), a family with muscular dystrophy where four males showed a partial deletion of the Y chromosome (Muldal & Ockey, *Lancet*, 9/9); discussion of a mechanism which could produce the large extra chromosome reported in Waldenström's macroglobulinemia (Patau, *Lancet*, 9/9), and of the possible significance of enlarged satellites in a pedigree with five cases of severe malformation of the central nervous system (Ellis and Penrose, *Ann. Hum. Genet., Lond.* 25: 159-162).

Two papers suggested the usefulness of constrictions in normal human chromosomes as an aid to their identification in Denver Group III (De La Chapelle and Muldal & Ockey, *Lancet*, 8/26).

Bender and Gooch (*Lancet*, 8/26) found an unusually long Y chromosome

in an apparently normal man, while Sandberg, Koepf, Ishihara and Hauschka (*Lancet*, 8/26) interpreted the karyotype of a 44-year-old father without phenotypic abnormality, whose six children included a. o. one mongol, as an XYY male. Ellis, Miller, Penrose and Scott (*Ann. Hum. Genet., Lond.*, 25: 145-151) reported a mentally retarded male whose sex chromosome complement appeared to be XXYY.

Kemp, Stafford and Tanner (*Lancet*, 8/19) report a case of acute leukemia in a 73-year-old man whose peripheral blood and bone marrow studies yielded chromosome counts of 47, the extra chromosome falling into group III (6-12). In the absence of clinical signs of Klinefelter's syndrome and without pathological examination of the gonads in a man who reputedly fathered a daughter, whose buccal mucosal smear was chromatin negative and whose skin biopsy showed a normal male karyotype, the suggested association of Klinefelter's syndrome with acute leukemia must be interpreted with caution.

A new approach to chromosome studies in leukemia, which avoids culturing, by means of dipotassium ethylene-dinitrilo tetra acetate (EDTA), has been utilized by Kinlough & Robson (*Brit. Med. J.*, 10/21) in 16 cases.

Bouton, Phillips, Smithells & Walker (*Brit. Med. J.*, 9/30) describes a case of congenital leukemia in an infant whose parents were first cousins. Chromosome studies on peripheral blood revealed no abnormality in the baby (17 cells counted, 7 analyzed) or either parent.

DOWN'S SYNDROME (MONGOLISM)

Ek, Falk, Bergman and Reitalu (*Lancet*, 9/2) describe the case of a boy with Down's syndrome whose mother had two other mongoloid children as well as a similarly affected sister (all deceased). The patient had 46 chromosomes with a presumptive reciprocal translocation. The mother's karyotype is not reported.

A karyotype analysis of the second mongol offspring of two young parents (their only previous child died at the age of eight months with multiple anomalies and classical features of mongolism) was said to be consistent with trisomy #21. Both parents were reported to have normal chromosome constitution. Lubs (*Lancet*, 10/14) suggests that in some families a genetic factor may operate in the etiology of non-disjunction.

A similar suggestion was made by Hamerton, Briggs, Gianelli and Carter (*Lancet*, 10/7) with regard to the finding of a second child with trisomy #21 in six out of nine families with more than one affected child. In the remaining three families one parent carried translocations or isochromosomes involving #21. These nine families were derived from a study by Carter and Evans (*Lancet*, 10/7) of the sibs of 642 index cases with Down's syndrome. The risk of parents who had had one affected child having another child similarly affected was calculated to be approximately 50-fold the random risk for mothers under age 25 and only 5-fold for mothers age 25-34. For mothers over 35 no increased risk was observed.

Rundle, Coppen and Cowie (*Lancet*, 10/14) also reported a difference between younger and older mothers of children with Down's syndrome. Thirteen of 34 mothers who had given birth to an affected child before the age of 27 showed a significantly higher output of dehydroepiandrosterone than did the 21 mothers who had their first affected child at an older age.

A possible association between maternal radiation and Down's syndrome

was discussed by Uchida and Curtis (*Lancet*, 9/14), while a new analysis of the Hiroshima and Nagasaki data led de Bellefeuille (*Acta Radiol.*, 56: 65-159) to the conclusion that the genetic hazards of radiation to man are considered not only from nuclear weapons but also from clinical use of X-rays. He warns that 6 to 13% of inborn defects and diseases in children born at this time in technologically advanced countries are attributable to diagnostic X-rays prior to conception.

HEMATOLOGIC STUDIES

Hemophilia A in a chromosomally normal female, the daughter of a healthy father, was reported by DeLaChapelle, Ikkala & Nevanlinna (*Lancet*, 9/9). They suggest a number of possible explanations for this presumed exception from a sex-linked recessive mode of inheritance. In a comment on this report Steinberg (*Lancet*, 10/14) suggests that the patient may be a heterozygote and yet show clinical manifestations of hemophilia. In this connection it is of interest that another chromosomal female with hemophilia A was recently reported in *Blood* (17: 719-727). In this case of Mellman, Wolman, Wurzel, Moorhead & Qualls the 8-year-old girl had a history of 32 hospital admissions since the age of 18 months, all for management of bleeding episodes.

Heterozygote carriers of the thalassemia gene are reported to constitute approximately 20% of 260 children tested in an isolated Maltese village, although "no cases of thalassemia major have yet been noted in this village" (Vella and Sant Cassia, *Lancet*, 9/16).

The relationship between glucose-6-phosphate dehydrogenase deficiency and malaria was the subject of a further exchange of letters between Allison and Clyde (*Brit. Med. J.*, 8/19) and Wilson (*Brit. Med. J.*, 9/30). The subject was also discussed by Siniscalco, Bernini, Latte & Motulsky (*Nature*,, 190: 1179-1180).

Adam (*Bull. Res. Counc. Israel*, 9E: 89) reports on an investigation of linkage between glucose-6-phosphate dehydrogenase deficiency and color blindness.

REPORTS CONCERNING TWINS

Barr and Stevenson (*Ann. Hum. Genet., Lond.*, 25: 131-140) have analyzed data on stillbirths, infant mortality, and congenital malformations as a cause of death in 17,169 pairs born between 1949 and 1950 in England and Wales.

Bergamaschi and Coucourde (*Acta Ge. Me. Ge.*, 10: 331-339) report that intrapair differences in the osseous development of fetuses belonging to 12 monochorial and 15 bichorial twin pairs were not significant. They provide a listing for each pair.

Two pairs of one-egg twins concordant for Hashimoto's thyroiditis are reported by Irvine, Macgregor, Stuart and Hall (*Lancet*, 10/14), while a pair of twins concordant for Down's syndrome (trisomy #21) and Klinefelter's syndrome is reported by Hustinx, Eberle, Geerts, ten Brink and Woltring (*Ann. Hum. Genet, Lond.*, 25: 111-115). A pedigree, including a pair of male twins concordant for Waardenburg's syndrome, is described, and shows independent transmission of recessive deafness and Waardenburg's syndrome (Lavergne, *J. Génét. hum.*, 10: 80-85), while Perry (*Brit. Med. J.*, 9/16) reports on a case of concurrent intrauterine and ectopic pregnancies.

Shields (*Acta Ge. Me. Ge.*, 10: 366-369) examined the fusional reserves (ability to hold in focus with both eyes two parts of an image as they are separated) of 14 adult monozygotic (6 male, 8 female)

pairs and failed to confirm the postulated relation to leadership qualities. He did report, however, that in his small sample the twin partner with higher fusional reserves tended to be the more introverted, the more intelligent, the taller and the first born.

MISCELLANEOUS REPORTS

Clarke, McConnell and Sheppard (*Ann. Hum. Genet., Lond.*, **25**: 25-27) published a further family with *nail-patellar syndrome* linked to blood group A_1. One cross-over occurred among the eight individuals who might have inherited the condition. Pons (*Ann. Hum. Genet., Lond.*, **25**: 141-144) investigated the *hand-clasping pattern* of 688 Spaniards and failed to observe a significant difference in the frequencies of right and left claspers (52.1% right, 47.9% left) in a group of 486 unrelated persons. Neither were significant differences observed between offspring of different mating types. The test employed in these studies is not designed to detect left-handers in terms of the conventional classification by which approximately 5 to 10% of the general population fall into the left-handed group.

Skude (*Acta Ge. Me. Ge.*, **10**: 316-319) utilized a paper chromatography method for detecting the influence of saliva on phenythiourea. No significant differences were recorded for the salivas from the three different groups of non-tasters, tasters and sweet tasters.

van Bogaert (*J. Génét. hum.*, **10**: 1-19) published a further discussion of a family with juvenile amaurotic idiocy previously reported.

Matson, Schut and Swanson (*Ann. Hum. Genet., Lond.* **25**:(7-23) failed to obtain evidence of linkage between hereditary blood factors (ABO, MN, Rh, Lewis, Kidd, Duffy) and *hereditary ataxia* in a family including 53 ataxic members. Ability to taste PTC and haptoglobin studies were equally unrewarding. The authors pointed out that the 408 family members included many deceased persons who could not be studied and 70 members still in the age period of risk. Leyburn, Thomson and Walton (*Ann. Hum. Genet., Lond.*, **25**: 41-49) were similarly unsuccessful in detecting female carriers for the Duchenne type of *muscular dystrophy*, using a series of biochemical techniques.

Bulmer (*Ann. Hum. Genet., Lond.*, **25**: 163-164) analyzed data published previously on *fibrocystic disease of the pancreas* and concluded, contrary to the original author's opinion, that the data were compatible with a recessive mode of inheritance.

The control of *phenylpyruvic oligophrenia* forms the subject of two recent papers: Brimblecombe, Blainey, Stoneman & Wood (*Brit. Med. J.*, 9/23); Stroder, Geisler & Heim (*Ann. Paediat.*, **196**: 363-378), while the familial occurrence of *collagen diseases* is discussed by Hagberg, Leonhardt and Skogh (*Acta Med. Scand.*, **169**: 727-734) and Leonhardt (*Acta Med. Scand.*, **169**: 735-742).

The vascular response to noradrenaline in young adult normotensive sons of hypertensive parents was investigated by Doyle and Fraser (*Lancet*, 9/2) who observed a greater vascular reactivity in offspring of hypertensive parents than of normal parents. Maddock (*Lancet*, 8/19) surveyed two Pacific Island populations without obtaining evidence of essential hypertension in either group. A critical commentary on the treatment of the data has been provided by Pickering (*Lancet*, 9/30).

The need for caution in genetic counseling is dramatically illustrated in Dungal's experience with listeriosis in four

siblings (*Lancet*, 9/2). In this case prenatal infection remained undetected throughout three pregnancies and it was only during the fourth pregnancy (which was terminated because of the history of three successive congenital malformations with early fatality) that a correct diagnosis was made. The fifth pregnancy resulted in a healthy child.

Review articles in medical genetics include those of Platt (*Eugen. Rev.*, 53: 77-86) and Hanhart (*Schweitz. Med. Wschr.*, 91: 721-756). In addition, an entire issue of the *Brit. Med. Bull.* (17: 177-261) was devoted to a symposium on human genetics. The 20 distinguished contributors discussed various aspects of human genetics including cytogenetics, pharmacogenetics, inborn errors of metabolism, and hereditary factors in various other human traits and congenital malformations.

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POPULATION

Industrialization and the family in sociological theory. Sidney M. Greenfield. *American Journal of Sociology* 67, 3 (November 1961), 312-322.

A key proposition which demography has taken over from sociology is the assertion that urbanization and industrialization, of necessity, lead to the replacement of the traditional, multi-generation extended family by the nuclear family consisting only of parents and their immediate offspring. The nuclear family, in turn, is believed to be less conducive to the rearing of large families.

This argument is so eminently convincing for a variety of theoretical reasons that it has become a truism. But how true is the truism? Greenfield believes that it is in need of major qualification.

Specifically, he finds (a) that urbanization and industrialization may exist without the small nuclear family, and (b) that the small nuclear family may exist without urbanization and industrialization. An analysis of the family system of Barbados is used to buttress these contentions. In addition, he maintains that the small nuclear family antedated urbanization and industrialization in Europe and the United States, and implies that its present prevalence is not to be attributed to these forces.

The whole argument is in turn placed in the context of a discussion of functionalism as a form of sociological analysis.

The Recent History of the Extended Family in India. Henry Orenstein. *Social Problems* 8, 4 (Spring, 1961), 341-350.

The author addresses himself to the question of whether the extended family has declined in India under the impact of "Westernization," under which rubric he seems to include urbanization and industrialization, as well as other influences. His analysis is based on census data on household size taken from the decennial censuses of 1911 through 1951. He finds no evidence that household size has declined; it may even have increased. Orenstein finds that the data do not permit him to examine household composition in any detail, or to compare household size in urban and rural areas. Nevertheless, he believes that there has been little or no decrease in household size in India.

The possible effect of mortality improvements in balancing any tendency toward a reduction in household size is not examined.

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